



## - Method Statement – Upgrading existing sewer using a Pipe-bursting method



9 Ardeevin Drive, Lucan, Co. Dublin

**Document Issue**

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Rev.:	Description of Changes:	Author(s):	Checked by:	Approved by:	Date:
0	For planning	LK	EH	RoB	24 <sup>th</sup> Aug '21
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## 2. Job Description

The following document is a detailed method statement for 9 Ardeevin Drive, Lucan, Co. Dublin Upgrading existing sewer using a Pipe-bursting method. The advantage of this method is that it significantly reduces the risk of any vibration and on site during works and secondary settlement after completion. It also removes the need to open-cut along the pipeline route.

## 3. Sub-Contractors details

The following is a list of the subcontractors\* that we propose to utilise to carry out these works.

Contractors / Sub-Contractor Name	Address	Work to be Carried Out
Source Civil Ltd	Clar, Donegal Town	Main Contract works

\*Names above are subject to change

## 4. Drawing Numbers

The related drawing numbers are as per the contract/tender documents.

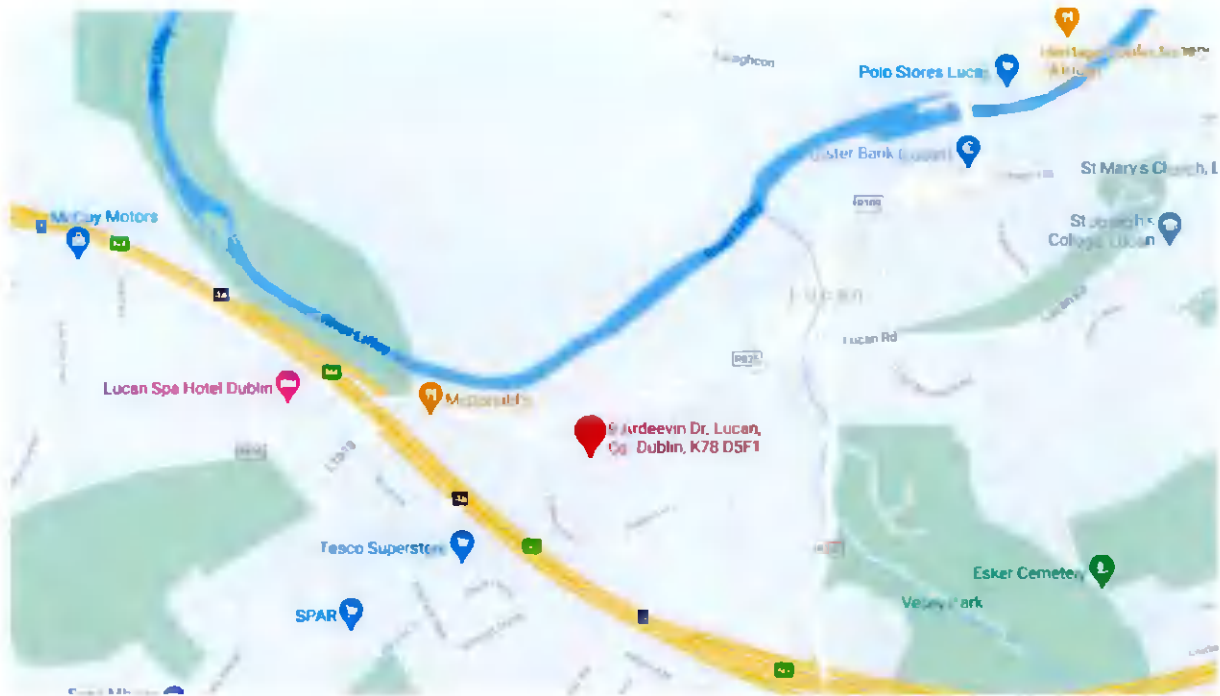
- Rory O'Brien - Lucan BRE Report
- ArdeevinDr - Sheet - 1120 - Underground Services Mark Up 210802
- Irish water Submission - Drawing Register
- ArdeevinDr - Sheet - 1210 - PROPOSED FOUNDATIONS - SHEET 1-FI2
- ArdeevinDr - Sheet - 1302 - PROPOSED ELEVATIONS - SHEET 2-FI2
- ArdeevinDr - Sheet - 1301 - PROPOSED ELEVATIONS - SHEET 1-FI2
- ArdeevinDr - Sheet - 1101 - PROPOSED LAYOUTS-FI2
- ArdeevinDr - Sheet - 1000 - EXISTING SITE PLAN
- ArdeevinDr - Sheet - 1100 - EXISTING LAYOUTS - DEMOLITION

## 5. Programme Task ID number

The programme task ID number is T.21.001

## 6. Job Location

The works are located at 9 Ardeevin Drive, Lucan, Co. Dublin



<https://www.google.ie/maps/place/9+Ardeevin+Dr,+Lucan,+Co.+Dublin,+K78+D5F1/@53.3546625,-6.4581598,17z/data=!3m1!4b1!4m5!3m4!1s0x4867724fb08407cb:0x3ef7aac494bc39d0!8m2!3d53.3546625!4d-6.4559711>

## 7. Commencement and Completion Dates

Commencement date: TBC

Completion date: TBC

## 8. Working Hours

Monday to Friday 0800 – 1800

Saturday 0800 – 1400

### 9. Scope of the Works

In the event of the existing sewer line that runs alongside the boundary wall and the dwelling the purpose of this document is to demonstrate that either planned works or emergency works can take place safely in the event of works are required along the wayleave of the pipeline.

### 10. Responsibility & Supervision

Source Civil Organogram will be provided 2 weeks prior to start.

### 11. Compounds, Storage and Welfare facilities

The site compound will be established within the site boundary at the location convenient to the main entrance. A secure compound with adequate storage, car parking on the road can be provided on the road with adequate signage.

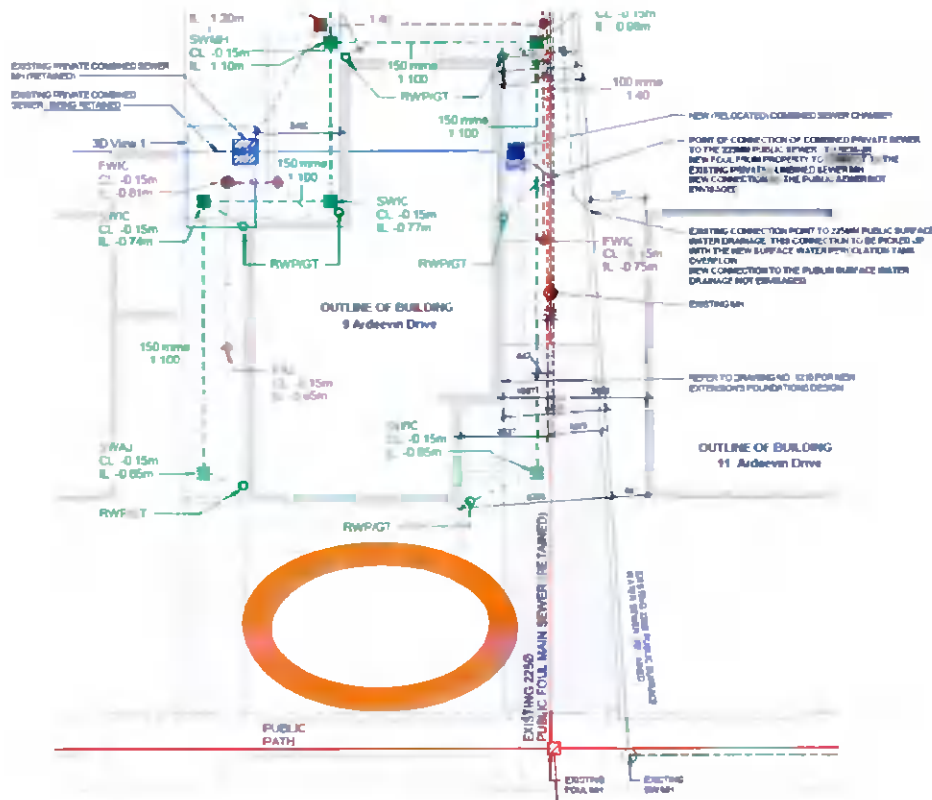


Figure 1.0 – Proposed Compound and office set up area

## 12. Major Construction Equipment to be utilised.

Statutory Certificates will be provided for all plant and machinery as required. (e.g. cranes – GA1/CR3/CR4A, excavators – GA1/HT2/CR2/HT4A/CR4A, chains, slings and lifting gear – HT6/CR6s etc.)

<b>Plant</b>	
1no.	5 Ton Excavator
1no.	6 Ton Dumper
1no.	8 Ton Hitachi Excavator
1no.	Mobile Diesel powerpack
1no.	Grundoburst 400
1no.	4" Diesel Pump with hoses
<b>Labour</b>	
1 no.	Machine Operators
2 no.	Skilled Operatives
1 no.	Ganger man
1 no.	General Operative
<b>Equipment</b>	
1no.	20' Office
1no.	Drying Hut
1no.	Canteen
1no.	Container
1no.	Toilet block/Welfare Unit

\*The above is indicative and is subject to change

### 13. Staff Involved

The following staff will be involved in the works:

Position	Name	Contact number
Agent	Rory O'Brien	TBC
Machine Operators	TBC	
Skilled Operatives	TBC	
Supervisor/Ganger	TBC	
General Operative	TBC	

\*All of the above items are indicative and is subject to change due to availability of staff at the time of contract commencement

### 14. General Overview of Method Specific Procedures

A concise list and breakdown of all procedures necessary for completion of the work

- Service Protection/Marking of Services
- Pipe-bursting
- Earthworks / Demolition
- Landscaping
- Pipe laying
- Manholes
- Site Set Up
- Daily Allocations
- Daily Records
- Testing of Pipelines
- Statutory Undertakers
- Reinstatement
- Traffic Management



## 15. Method and Sequence of Construction

### a) Mobilisation to Site

- All materials and equipment can be transported to site when required and stored in the lawn area in the front of the house.



Figure 1.1 – Access viewpoint

### b) Setting Out of the Works

- Setting out would be done in accordance with the current drawings together with wayleave agreements by Irish Water. All Statutory Authorities and associated bodies can be notified in advance of work commencing to enable the position of the existing infrastructure to be established.
- A full and detailed pre-condition survey will be carried out to ascertain condition of existing boundary wall, footpaths, house, garden etc in advance of the works commencing.
- Any service indicated on the survey will be exposed in advance of the pipe laying operation by digging strip trenches.
- Services identified will be recorded on the drawings

**c) Overhead Services**

- There are overhead lines to the south boundary (front of the house) extending in a single line to the gable of the property.
- Goalpost markers will be installed either side of this overhead and workers to be inducted as to its presence.



**Figure 1.2 – Presence of Overheads lines at entrance**

**d) Underground Services**

- The drawing 'ArdeevinDr - Sheet - 1120 - Underground Services Mark Up 210802' shows existing services. All recommendations given by the ESB representative must be followed. Before excavations begin, a cat detector survey will be carried out to establish the locations of any uncharted services in the vicinity of the works and these services will be sprayed out on the ground. Machine drivers will be made aware of all these services by the use of "A Permit-to-dig" forms (which must be signed by Supervisors and Drivers).

**e) Traffic Management Installation**

- A suitably trained and responsible person will be designated the task of design, setting out signs and cones etc. He/she will be responsible for the maintenance of the signs throughout the duration of the works, ensuring that they are cleaned regularly and that signs and cones which are removed to allow access for site traffic are immediately replaced.

### f) Temporary Works

- A temporary works design will be carried out for all aspects of the works. It will be approved and signed off (as per Appendix E) by Source Civils' Temporary Works Co-ordinator (TWC) on site.
- The existing boundary wall to the side of the property will be propped and secured where it falls adjacent to the works. Any unsteady section of the boundary wall will be taken down prior to excavation works in agreement with the property owner on each side. A 'Wailer beam' will be then placed across the top of the wall and 'Super-soldier' props at 2m centres will be secured to the ground along the length of the wall.
- Over-pumping will be set up on the upstream MH using a plug or Bung with the 4" suction hose attached into the pump and lay flat hose will then travel along the route at ground level whereby it will discharge into the downstream MH.
- Hard barriers and signage will be placed around open manhole chambers for duration of the works.
- Timber sheets and insulation will be secured to the house to provide bumper protection during the works particularly at the pinch point to the rear east corner of the extension.
- For the purposes of the trench excavation barriers will be put in place to identify the exclusion zone.
- Trench sheets and frames will be used to protect against the ground collapsing into the trench. The use of Trench sheets will minimise the trench dig to 1.2M wide mitigating any risk at pinch points between the boundary wall and the property.
- The following design codes will be used when completing the temporary works Design:
  - IS EN 1997-1: 2005 Eurocode 7
  - IS EN 1993-5: Eurocode 3 Part 5 Piling
  - CIRIA C760 (2017) Embedded Retaining Walls - Guidance for Economic Design

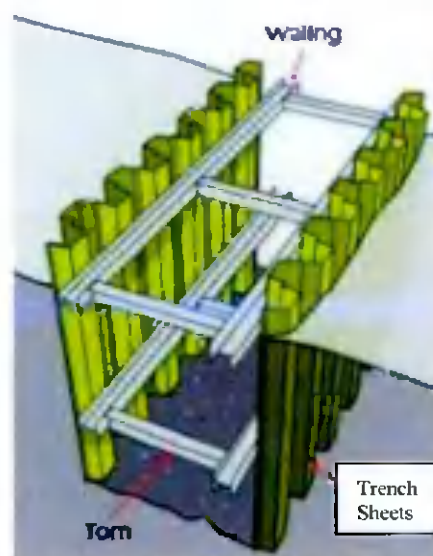
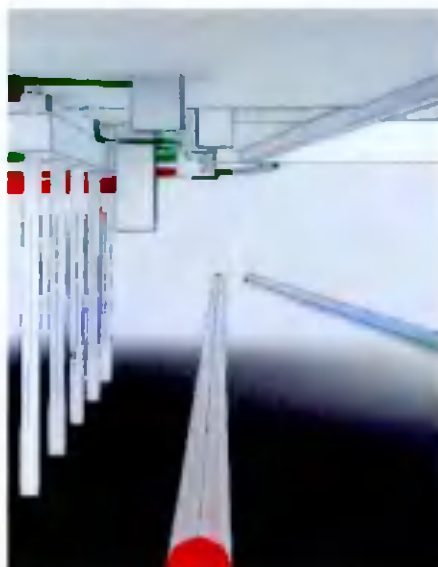


Figure 1.3 & 1.4 – Presence of sewer & temp works proposal respectively

### g) Pipe-bursting Operations

- **Launch and Reception Pits are required for the Pipe-Bursting replacement method.**
- Excavation of the Launch & Reception Pits will be carried out by a Zero Swing 8ton 360-degree excavator (as per **Appendix D**). The work crew will expose any services by hand before allowing the excavator to proceed.
- The excavation of the reception pit will be dug at 1m deep intervals. The trench sheets are then lifted into position and installed along with the frames. The excavation then continues at 1m steps to reach the invert level of the sewer pipe. The pipe will be exposed along its length by hand-dig to avoid causing damage to it.
- Once the reception pit is completed as per the above the launch pit will be dug in the same manner.
- All operatives will have the necessary skills and training to successfully complete the specific task.
- The pipe bursting rig will be delivered to site on 14ft flatbed trailer. The bursting rig along with accessories will be unloaded using an 8-ton Hitachi excavator accompanied with certified lifting equipment.
- A mobile diesel power pack will also be delivered to site to power the rig.
- The reception pit has been excavated to a depth of approx. 3.1m
- The 50 tonne Grundoburst rig will be set up here and a displacement plate will be placed directly on front of the temporary works Trench sheets and frames.
- The bursting rig (Shown in **Appendix F**) will be set on firm ground conditions and propped at either side using timbers to stabilise.
- The bursting rig will be powered by a diesel power pack that will be located up on ground level a safe distance back from the pit.
- Hydraulic hoses will be attached to the bursting rig to supply power.
- One-meter-long steel threaded rods will be fed through the hydraulic clamp by hand, joined and tightened.
- Approximately 100 no rods will be available in the kit to reach the exit pit.
- Once the rod reaches the launch pit, a bursting cone and sleeve will be attached to the new 315mm SDR 11 PE pipe and the Rod.
- Pipe strings previously butt fused together and set along the agreed location will be lifted into position using the 8T excavator and straps prior to reaming and pulling of the strings.
- The Bursting equipment will allow the cone followed by the replacement pipe to be pulled back from the launch pit while displacing the old pipe fragmenting it radically into the surrounding ground through bursting.
- Pit stability and safety will be monitored by Site Engineer and recorded in AF3 forms. Where required suitable additional shoring will be implemented.
- Pipe strings will be fused together using EF couplers and EF welder. Trained welding operative will undertake welding using calibrated EF Welder & generator.
- Once welding had been completed, pits will be backfilled as per IW Standard detail and in accordance with reinstatement requirements.
- Backfilling of the trench will be completed using CL804 material compacted in layers no thicker than 225mm to the engineer's detail. Topping up will be completed using the excavated soil.

- Open trenches not being actively worked on, should be always fenced off.
- New MH's will be constructed (as noted in **Figure 1.5** below) using a 1200mm dia Precast concrete Tracey Concrete ring. It will be benched and surrounded in concrete with a D400 cover placed to the correct finished level. This will occur in the reception pit and launch pit site constraints dependent.

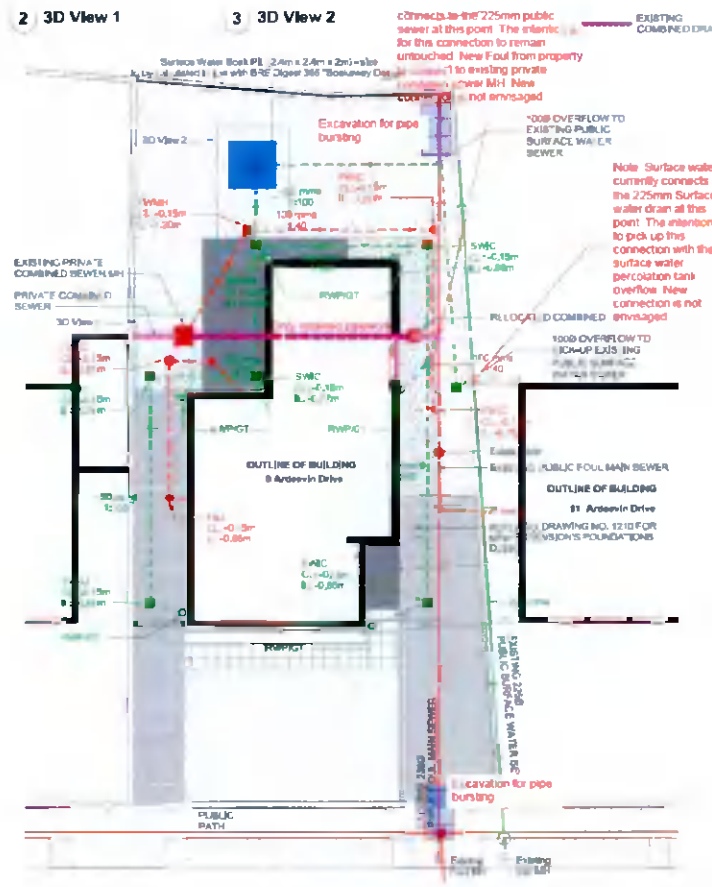


Figure 1.5 – Proposed location of the new MH's



Figure 1.6 – Presence of 225mm dia sewer 3.1m below ground level

## **h) Completion of works**

All snags relating to the works will be completed prior to demobilisation to the satisfaction of the Resident Engineer's staff and all offices and materials will be fully removed off site. The site compound and offices will be removed accordingly for demobilisation.

## **16. Quality Controls**

Source Civil quality plan will be in place prior to works starting

## **17. Environmental Impacts**

- Garden and shrubbery will be re-instated post work activities
- All excavated materials which are not reused will be disposed of responsibly using registered waste management contractors.

## **18. Safety Controls**

- The Site Specific HSQE Plan will detail all Health & Safety Controls for the Project.
- The work crew will be familiar with this Risk Assessment Method statement
- All activities will be covered under a detailed plan of action compiled by the work crew
- Work procedures will follow this RAMS document
- Works will be paused to deal with any change to the agreed procedures

## **19. Authorisation/Permits**

Details of authorisations and permits required to carry out the work in this case:

- Confined space entry permit
- Permit-to-dig

## **20. Hazard Identification/Required Controls & PPE Requirements**

- Deep excavation will be supported against collapse by suitably sized trench sheets and frames
- Tight site will be managed by limiting the width of the excavation to 1.2M. A Zero swing excavator and 6 ton, 2.4M wide dumper will be used.
- Existing underground services will be exposed by hand dig.

- Method Statements and Risk Assessments will be carried out prior to works commencing and can be viewed in our Health and Safety File kept on site.
- The boundary wall to the side of the Reception pit will be propped and secured using soldier props, timber sheeting and a Wailer Beam. Any unsteady section will be taken down prior to excavation works
- Overhead lines will be 'goal-posted' to highlight the importance of such services. Any excavations will be scanned, trial holes and/or slip trenches carried out prior to excavating as previously mentioned above.
- All site staff will be required to wear a hard hat, high viz vest, and safety shoes as a minimum as per Site Specific HSQE Plan. Any other specialist PPE will be provided as the project progresses.

## **21. Temporary Lighting measures**

Should works require lighting in the dark evenings or at night-time works for emergency works temporary tower lights powered by diesel generators can be placed around the back and front of the dwelling to assist working and will be carefully set up as to avoid shadowed spots.

## **22. Access and Egress Points**

The main access point will be in the front gate of the dwelling at No. 9 Ardeevin Drive.

## **23. Interface (Railway, Public and Other Works)**

### **a) Railway**

N/A

### **b) Public**

There will be interaction between the public and the works. Imported material & trench arisings will arrive/depart from the public road. Adequate Signage will be in place as previously mentioned in the TMP section above.

### **c) Other Works**

No other contractors are scheduled to be working within our site boundary.

#### **24. Emergency Procedures**

The Contractors Emergency Procedure will be followed in the event of Accidents and/ or Emergencies.

The names of the persons qualified in first aid and the location of the first aid boxes will be made known to all working on the project at the site induction.

In the case of further medical attention being required a list of emergency telephone numbers will be displayed on the walls of the Office and Canteen, a copy of which is shown on Appendix A

#### **25. Briefing Arrangements**

All personnel involved in the works will be briefed on this method statement. The nominated person responsible for briefing this method statement is the Site Agent named in Section 4 above.

All personnel must sign off the confirmation of communication of method statement attendance sheet attached in Appendix C.



26. Appendix A

<b>EMERGENCY TELEPHONE NUMBERS</b>	
The appointed person named in Section 4 of the Method Statement will contact the following in the event of an emergency:-	
<b>Ambulance</b>	<b>999/112</b>
<b>First Aiders on Site:</b>	
<b>Connolly Hospital Blanchardstown</b>	<b>01 646 5000</b>
<b>Local Doctor-</b>	
<b>Gardai Garda Station (insert local)</b>	<b>999/112</b>
<b>Fire Brigade Fire Station (insert local)</b>	<b>999/112</b>
<b>Dublin City &amp; County Council</b>	
<b>E.S.B. Emergency</b>	<b>1850 372999</b>
<b>Gas Emergency</b>	<b>1850 205050</b>
<b>Eircom</b>	<b>1902</b>
<b>Safety Officer –</b>	
<b><i>Fire Extinguishers and First Aid Box are kept in the Main Site Office at all times</i></b>	



28. Appendix C

Risk Assessments

Risk Control Measures & Preventative Procedures

RISK ASSESSMENT-No 1		
Work Activity Ref: Access/Egress	Everyone will be able to reach their place of work safely, i.e. good roads, gangways, passageways, passenger hoists, staircases, ladders and scaffolds	Risk Medium - High
Method	Mobility around site be it pedestrian or vehicular, material storage, waste control.	
Hazards	Tripping, falling from heights, falling objects, plant and machinery at work etc	
Risks	Fall from heights, HEAD & Foot injury	
Population Exposed	Operatives primarily and others working/passing.	
Controls Statutory See Relevant Regs.	Safety, Health & Welfare at Work act 2005 and The Safety, Health & Welfare (Construction) Regulations 2013 place an obligation under law to maintain safe Access and Egress to all places of work	
Controls In-House	Overhead protection will be provided as necessary to prevent injury from falling object. All walkways will be stable and free from obstruction such as stored materials and waste and debris. Adequate barriers or other edge protection to prevent falls from open sides of buildings, gangways etc. will be provided. Holes and openings will be securely fenced off or securely fixed covers will be provided. The site will be kept tidy and materials stored safely. Nails in timber will be hammered down or removed.	
Consultation	All employees and visitors to be inducted and informed of these requirements.	
Documentation	No documentation required	
Implementation	Site supervisors and all personnel to monitor on a daily basis	
Information Instruction	New employees- inducted on company policies and procedures and for safe working before permitted to work.	
Training	All personnel to be registered under FAS Safe Pass or similar approved.	
PPE	Hard hats, boots and visibility vest a minimum	
Monitoring	On going through the working day by both supervisors and operatives.	
Systems Review	Review on a site by site basis and weekly site inspection.	

*Risk Assessment After Controls are implemented: Medium*

**RISK ASSESSMENT-No2**

<b>Work Activity</b> Ref: Excavations	Footpaths, chambers, ducts and services. Underground cables and gas services. Excavations adjacent to existing service	<b>Risk</b> <b>HIGH</b>
<b>Method</b>	Plant and machinery, hand digging	
<b>Hazards</b>	Burial/injury from trench collapse, Falling objects & Electrocutation from underground services	
<b>Risks</b>	Burial/injury from trench collapse, Falling objects Falling from heights (into Excavation). Injury or drowning resulting from burst watermain	
<b>Population Exposed</b>	Operatives primarily and others working/passing.	
<b>Controls Statutory</b> See Relevant Regs.	Form AF3 must be completed and signed by a competent person following thorough examination of Excavations, Shafts, Earthworks, Underground Works etc. in compliance with Construction Regulations of 2013	
<b>Controls In-House</b>	<p>Before commencing any excavation works, the Site Manager will establish the exact location of existing services and the precautions necessary to ensure the safety of persons. The ground investigation data received shall be reviewed for consideration of specific trench support system (ie sheet piling, trench boxes etc (specific control measures shall be detailed on task risk assessments) )</p> <p>All excavations are to be kept free of groundwater by the use of pumps. Groundwater to be over-pumped to suitable location Suitable. Before work takes place in an excavation the sides are to be assessed to determine what controls are to be put in place to ensure the safety of the workers working inside these. Where excavations are deep and dangerous or adjacent to other structures, the temporary support system will be designed and supervised by a competent person. All materials and components used in trench support systems will be sound and strong enough for the purpose. A safe method will be developed for putting in trench supports or timbering, which does not require persons to work in an unsupported trench. If the sides of the excavation are sloped or battered, the angle of batter will be sufficient to prevent collapse. Where temporary support systems are being used, they will be inspected at least daily as work progresses. There will be safe access to the excavation using a ladder extending at least 1 metre above the edge and secured in position. Suitable barriers will be placed around excavations where persons are liable to fall any distance. All excavations, which present risk to the safety of the general public, will be protected with suitable barriers. Materials will not be placed or stacked so close to an excavation as to endanger persons at work below. No load, vehicle, plant or equipment will be placed or moved near the edge of any excavation where it is likely to cause collapse of the side of the excavation. Where vehicles tip into an excavation, properly secured stop blocks will be provided. Persons working in excavations will be advised to be alert to any accumulation of dust or fumes and to take precautions as appropriate, by ventilating the area or wearing appropriate respiratory protection equipment.</p>	
<b>Consultation</b>	The Site Manager will check with relevant Public Utility Authorities in relation to underground services, i.e. electric cables, gas, water and drainage pipes, telephone cables, fuel lines	
<b>Documentation</b>	<p>Form AF3 Note states: Thorough examination must be carried out :- (i) Where explosives have been used in or adjacent to the work area in a manner likely to have effected the strength or stability of any plant, equipment or temporary works. (ii) Where any plant or equipment, or temporary works has sustained damage, or where there has been any unexpected fall or earth, rock or such like. (iii) At least once within the immediately preceding seven days</p> <p><b>Excavation Permit must be completed as attached at the back of this document</b></p>	
<b>Implementation</b>	Site supervision to ensure all relevant information is passed on to operatives	
<b>Information Instruction</b>	New employees- inducted on company police and procedures and for safe working before permitted to work.	
<b>Training</b>	All personnel to be registered under FAS Safe Pass or similar approved. All plant operators	

	to be registered under the FAS CSCS scheme or similar approved.
<b>PPE</b>	Hard hats, boots and visibility vest a minimum
<b>Monitoring</b>	Refer to documentation above and AF3 form for details,
<b>Systems Review</b>	Review periodically to confirm validity of designs and training methods

**Risk Assessment After Controls are implemented: Medium**

**RISK ASSESSMENT-No5**

<b>Work Activity Ref: Cranes / Lifting Equipment</b>	Loading/unloading of materials. Placing equipment, installation of ducts and manhole boxes	<b>Risk HIGH</b>
<b>Method</b>	Cranes, loadalls, excavators. Etc	
<b>Hazards</b>	Collapse/failure due to inadequate foundations, inspection, testing and maintenance, incompetent operators/ banks-men, lack of attention to safe working loads, contact with overhead electric cables. due to inadequate ties/supports	
<b>Risks</b>	Accidents resulting from inadequate maintenance, dangerous driving, unauthorised operators, uncontrolled lifting, touching overhead electric cables etc.	
<b>Population Exposed</b>	Operatives primarily and others working/passing. Members of the public	
<b>Controls Statutory See Relevant Regs.</b>	Safety, Health & Welfare at Work act 2005 and The Safety, Health & Welfare (Construction) Regulations 2013 place an obligation for safe access/egress and a safe system of work. Approved form All lifting appliances, chains, ropes and lifting gear, and the use thereof, must be in compliance with Regulations	
<b>Controls In-House</b>	Cranes and lifting equipment: Will be maintained by a competent person (name) The Site Manager will ensure that all personnel concerned with the lifting operations know the safe working loads and weight of object to be lifted. Will be operated only by trained / experienced person over eighteen years of age. Two-way communications between crane driver and banksman / signaller will be provided when appropriate to the safety of operations. All statutory tests and examinations as required on cranes and lifting equipment will be carried out and certificates and records maintained (use appropriate Forms). Statutory tests on equipment belonging to The Contractor will be carried out as required by current legislation. Proper slinging and signalling will be used on all sites and operators, banksmen / signallers and slingers will be familiar with approved methods and systems. An approved safe working load indicator will be used on jib cranes and inspected by a competent person before use, and when the crane is in use, will be inspected at intervals not exceeding one week by a competent person. Routes for vehicles to be specified, use barriers and signage to protect danger areas	
<b>Consultation</b>	Above to be discussed with all operators and banksmen personnel	
<b>Documentation</b>	In cases of plant: GA 1&2 and other approved form	
<b>Implementation</b>	Site supervision to ensure all relevant information is passed on to operatives	
<b>Information Instruction</b>	New employees- inducted on company police and procedures and for safe working before permitted to work.	
<b>Training</b>	All personnel to be registered under FAS Safe Pass or similar approved. All plant operators to be registered under the FAS CSCS scheme or similar approved.	
<b>PPE</b>	Hard hats, boots and visibility vest a minimum	
<b>Monitoring</b>	Constant supervision to regularly check arrangements during progress of job.	
<b>Systems Review</b>	Review periodically to confirm validity of designs and training methods	

**Risk Assessment After Controls are implemented: Medium**

**RISK ASSESSMENT-No6**

<b>Work Activity Ref: Machinery</b>	Cutting tools, drills, vibrators etc.	<b>Risk HIGH</b>
<b>Method</b>	Cutting pipes, drilling, breaking out.	
<b>Hazards</b>	Accidents due to inadequate inspection and maintenance, unguarded moving parts/blades, incompetent operators.	
<b>Risks</b>	Accidents resulting from inadequate maintenance, dangerous usage, unauthorised operators, cuts, bruising, crushing	
<b>Population Exposed</b>	Operatives primarily and others working/passing.	
<b>Controls Statutory See Relevant Regs.</b>	Safety, Health & Welfare at Work act 2005 and The Safety, Health & Welfare (Construction) Regulations 2013 place an obligation for safe access/egress and a safe system of work. All lifting appliances, chains, ropes and lifting gear, and the use thereof, must be in compliance with Regulations XIV and XV of the Regulations.	
<b>Controls In-House</b>	All machinery will be maintained in safe working order. All dangerous parts, e.g. chain drives, exposed gears, projecting engine shafts, cutting blades etc. will be guarded. Guards will be correct for the machine, secure and in good repair. Only authorised and properly trained persons will be allowed to operate machinery. Personal protective equipment, as appropriate, will be provided and used by persons operating machinery. Such safeguards, as are necessary, must be put in place to protect the health and safety of other persons who may be at risk when machinery is in use. Machinery will be immobilised when there is risk of interference by unauthorised persons or children. Routes for vehicles to be specified, use barriers and signage to protect danger areas	
<b>Consultation</b>	Above to be discussed with all operators and personnel	
<b>Documentation</b>	In cases of plant approved FORMS: GA1 & GA2	
<b>Implementation</b>	Site supervision to ensure all relevant information is passed on to operatives	
<b>Information Instruction</b>	New employees- inducted on company police and procedures and for safe working before permitted to work	
<b>Training</b>	All personnel to be registered under FAS Safe Pass or similar approved. All plant operators to be registered under the FAS CSCS scheme or similar approved.	
<b>PPE</b>	Hard hats, boots and visibility vest a minimum, other PPE as necessary, gloves only to be worn when there is no risk of entanglement	
<b>Monitoring</b>	Constant supervision to regularly check arrangements during progress of job,	
<b>Systems Review</b>	Review periodically to confirm validity of designs and training methods.	

**Risk Assessment After Controls are implemented: Medium**

## 29. Appendix D

### Appendix D – Excavator Data Sheet

# ZAXIS85USB



## HYDRAULIC EXCAVATOR

Model code : ZX85USB-6

Engine rated power : 42.4 kW (ISO14396)

Operating weight : MONOBLOCK BOOM : 8 430 – 8 650 kg

2-PIECE BOOM : 8 850 – 9 060 kg

Bucket ISO heaped : 0.28 m<sup>3</sup>

**WEIGHTS AND GROUND PRESSURE**

**Operating Weight and Ground Pressure**

Monoblock boom

Shoe type	Shoe width	Arm length	kg	kPa (kgf/cm <sup>2</sup> )
Grouser shoe	450 mm	1.62 m	8 430	37 (0.38)
		2.12 m	8 470	37 (0.38)
Rubber shoe	450 mm	1.62 m	8 616	26 (0.29)
		2.12 m	8 650	28 (0.29)
Pad crawler shoe	450 mm	1.62 m	8 460	37 (0.38)
		2.12 m	8 500	37 (0.38)
Pad crawler shoe	450 mm	1.62 m	8 480	37 (0.38)
		2.12 m	8 520	37 (0.38)

Including 0.28 m<sup>3</sup> (ISO heaped) bucket weight (211 kg)

2-Piece boom

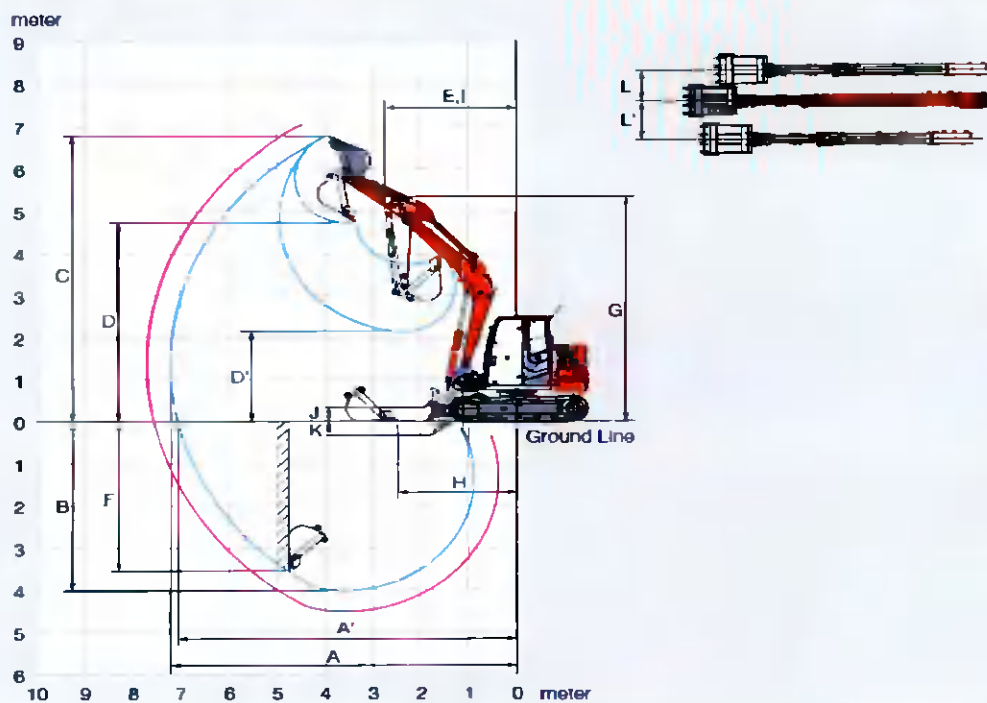
Shoe type	Shoe width	Arm length	kg	kPa (kgf/cm <sup>2</sup> )
Grouser shoe	450 mm	1.62 m	8 750	39 (0.40)
		2.12 m	8 730	36 (0.40)
Rubber shoe	450 mm	1.62 m	8 236	30 (0.30)
		2.12 m	9 080	30 (0.30)
Pad crawler shoe	450 mm	1.62 m	8 880	39 (0.40)
		2.12 m	8 910	39 (0.40)
Pad crawler shoe	450 mm	1.62 m	8 900	39 (0.40)
		2.12 m	8 940	39 (0.40)

Including 0.28 m<sup>3</sup> (ISO heaped) bucket weight (211 kg)

**BUCKET AND ARM DIGGING FORCE**

Arm length	Monoblock boom		2-Piece boom	
	1.62 m	2.12 m	1.62 m	2.12 m
Bucket digging force (kN)	55.0 kN (5 600 kgf)		55.0 kN (5 600 kgf)	
Bucket digging force SAE - PCSA	47.0 kN (4 800 kgf)		47.0 kN (4 800 kgf)	
Arm crowd force ISO	39.0 kN (3 900 kgf)	52.0 kN (5 300 kgf)	38.0 kN (3 800 kgf)	52.0 kN (5 300 kgf)
Arm crowd force SAE - PCSA	36.0 kN (3 700 kgf)	31.0 kN (3 200 kgf)	36.0 kN (3 700 kgf)	31.0 kN (3 200 kgf)

**WORKING RANGES: MONOBLOCK BOOM**





30. Appendix E

Temporary Works Design Cert

TEMPORARY WORKS PERMIT

Project Name		Date
Project Address		Permit No.
Name of TWC		Employed by
Address		
Tel. No.		E-mail
Specialist Contractor (where applicable)		
Address		
Tel. No.		E-mail
Name of TWS		
Tel. No.		E-mail
Description of temporary works, or design brief No.		
Temporary works specific location, section, gridline reference, etc.		
Pre-erection arrangement checks:		
Temporary works drawings, specifications, calculations, Risk Assessments, Safety controls, Safe Method of Work		Date
On-site supervision has received full details of the design, including any limitations and guidance notes		Date
Recorded in the Temporary Works Register for the project		Date
*Proceed. Having checked pre-erection arrangements for the temporary works, I certify that, to the best of my knowledge and experience, the temporary works arrangements are sufficient to allow the temporary works to proceed.		
*Alteration, adjustment, maintenance and use. Having checked the temporary works progression, I certify that, to the best of my knowledge and experience, the temporary works have been altered, adjusted, maintained and used in accordance with design requirements and Method of Work.		
*Load. Having checked the temporary works construction and erection is in accordance with design requirements, permission is given to load the temporary works within the limits of the design.		
*Permit to dismantle. The permanent works, which have been constructed using the Temporary Works as described above, are now sufficiently advanced and have achieved adequate strength and stability. Permission is granted for the dismantling and removal of Temporary Works in accordance with design requirements and Method of Work.		
TWC signature	Date	Time

\*Delete where necessary

31. Appendix F

Appendix F – Pipe Bursting Rig



TECHNICAL DATA

GRUNDOBURST 400G  
 TT B110 OR TT B20

	metrical	Imperial
Dimensions of rig LxWxH	1.420 x 560 x 520 mm	55.91 x 22.05 x 20.47 in
Weight of rig	560 kg	1,234.59 lbs
Thrust	275 kN	61,822.48 lbf
Pulling force at 250 bar	400 kN	89,923.60 lbf
Pit size LxW	3.300 x 1.100 mm	129.92 x 43.31 in
Axle height	230 mm	9.06 in
Drive output at 2,000 rpm • 2,300 rpm • 3,000 rpm	• 55.1 • 24.4 kW	• 73.89 • 32.72 hp
Hydr. operating pressure	250 bar	3,625.95 psi
Old pipe Ø	ND 50 - ND 250 mm	ND 1.97 - ND 9.84 in
For pipe materials	PVC, PE, stoneware, ductile/ grey cast iron, AC, GFRP, steel	PVC, PE, stoneware, ductile/ grey cast iron, AC, GFRP, steel
New pipe Ø	up to OD 280 mm	up to OD 11.02 in
For pipe materials	PE, PP, stoneware, grey cast iron, GFRP, steel	PE, PP, stoneware, grey cast iron, GFRP, steel
Bursting rod Ø	54 mm	2.13 in
Bursting rod Ø alternative	35 (max. 200 kN) mm	1.38 (max. 44,961.80 kN) in
Bursting rod weight	7.5 kg	16.53 lbs
Effective bursting rod length	700 mm	27.56 in