SECTION 11 – Horizontal Directional Drilling (HDD) and Trenchless Utility Installations

SCOPE AND INTENT

This specification establishes the mandatory technical requirements and standard engineering practices for horizontal directional drilling (HDD) and related trenchless installations within the public Right-of-Way (ROW), within Public Utility Easements or on public property in the City of Hudson, Ohio. This standard serves to safeguard public and private infrastructure from underground utility strikes, cross-bores, and structural damage.

These regulations apply to Horizontal Directional Drilling (HDD) operations and extend to all trenchless and direct-burial subsurface utility installation methods, including horizontal boring, pipe jacking, pipe pushing, tunneling, pneumatic "missile/mole" operations, and static or vibratory plowing methods.

All activities governed by this specification must comply with all applicable federal, state, and local regulatory codes. Federal compliance mandates adherence to the Occupational Safety and Health Administration (OSHA) guidelines under 29 CFR § 1926.651 for specific excavation requirements, alongside the Pipeline and Hazardous Materials Safety Administration (PHMSA) standards under 49 CFR Part 192 and Part 196 regarding the minimum federal safety standards for the transportation of natural and other gas by pipeline. State-level operations must comply with Ohio Revised Code (R.C.) § 3781.25 through § 3781.32 concerning damage prevention and underground utility facilities. The City of Hudson retains absolute oversight authority over public rights-of-way. All work must conform to the City of Hudson Codified Ordinances, including Chapter 1016 governing street excavations, construction, public utility easements and right-of-way permits, Chapter 1419, Section 2.22 for the protection of existing utilities during water distribution work, and Section 4.11 for the protection of existing utilities during storm collection projects and the specifications as follows.

I. PREPLANNING AND DESIGN MAPPING REQUIREMENTS

The project design engineer (Plan Preparer) and the utility owner (Utility) are responsible for pre-bore infrastructure mapping to ensure that structural liability is not shifted exclusively to field implementation crews.

11.1 Right of Way Permit: The utility owner or project design engineer shall be required to apply for a public right-of-way permit with the City when work is going to take place within the public right-of-way, within a public utility easement and/or City property. The applicant must pay the application fee and submit a right-of-way bond for the amount specified in the application. The City of Hudson projects are explicitly exempt from all fee and bonding requirements. The application shall include a set of detailed construction drawings showing the proposed work. The utility owner or project design engineer will need an approved set of construction plans and a fully issued permit prior to starting any work.

11.2 Detailed Construction Drawings Minimum Standards: The applicant must submit a set of detailed construction drawings drawn to a minimum 40-scale that meet or exceed the minimum standards established herein. The construction drawings must capture comprehensive topographic details, property boundaries, roadways, public utility easements, and all existing public and private utilities in plan view. Profiles with calculated X, Y, Z coordinates shall be required for critical crossings, such as under roadways where multiple utility main crossings occur (including gas mains, fiber duct banks, force mains, or water trunk mains) and at large culverts or bridges with footings or headwalls, or as otherwise designated by the City. Additionally, the detailed construction drawings shall include a dedicated drill plan outlining all proposed entry and exit pits. All bend radii and drill depths must be mathematically calculated to eliminate utility conflicts. The design of the new facilities shall follow all requirements and standards set forth in this specification.

11.3 MANDATORY CLEARANCE AND BUFFER ZONES

Clearances shall be measured from the outside edge of the existing utility structure directly to the outside edge of the largest diameter back-reamer or compaction tool utilized, and not the diameter of the final product pipe or conduit bundle.

Minimum Clearance Matrix

Existing Infrastructure Asset Type	Minimum Horizontal Clearance	Minimum Vertical Clearance
Sanitary & Storm Sewers, Waterlines, Natural Gas Lines, Electric Lines and Conduits, Traffic Signals, Fiber Optic Lines	3 Feet*	18 Inches

** Any trenchless or plowing alignment proposed within less than 3 feet horizontally or 18 inches (1.5 feet) vertically of an existing City or County sewer, water line, electric duct bank, gas line, traffic signal conduit, fiber optic line, or other City infrastructure requires written approval from the City prior to permit issuance. For conduit sizes exceeding 6 inches in diameter, the City reserves the right to mandate greater horizontal and vertical clearances.*

II. OHIO811 NOTIFICATIONS AND MANDATORY FIELD VERIFICATION (POTHOLING)

11.4 OHIO811 Notifications: The Contractor shall physically mark the route, boundary, or footprint of the proposed excavation and/or work area on the ground using white paint or flags before the utility locators arrive, and notify the Ohio Utility Protection Service (OUPS or OHIO811) at least two (2) full working days (excluding weekends, legal holidays, and the day of notification) but no more than sixteen (16) calendar days prior to beginning any excavation or drilling operations. The Contractor cannot begin construction activities until all utilities have been marked and the tickets have been cleared.

11.5 Private and Unmarked Utility Locating: Compliance with OHIO811 does not absolve the Contractor of responsibility for locating unmapped or private assets. If a recorded utility cannot be verified (for example, as a result of broken tracer wire or non-conductive pipe material) or a private utility is unmarked, drilling operations shall cease immediately. In such events, the Contractor must deploy secondary surface geophysical locating methods, such as Ground Penetrating Radar (GPR) and electromagnetic induction, to resolve the locating blind spot before proceeding.

11.6 Escalation Protocol for Gas Infrastructure: If a gas main or service route remains unmarked or is unable to be located, the Contractor shall trigger an immediate escalation protocol with the gas utility asset owner. The Contractor shall immediately contact the utility owner to engage further field verification. Work within that immediate sector shall halt until the asset owner's field engineering team has properly marked or located the gas main or service in question. For unmarked or mismarked gas mains where the asset owner's field crew must physically expose facilities, all drilling and excavation work in the affected area shall remain halted until formal verification is complete. The City shall not be responsible for any costs, claims, or project delays incurred by the Contractor as a result of implementing or adhering to this mandatory escalation protocol for gas or any other utilities.

11.7 100% Visual Verification (Crossings): When a trenchless drill path or boring profile crosses an existing underground utility line, the Contractor must physically expose the existing facility to verify its exact depth and location before any tooling or drill heads enter the tolerance zone. The pothole must be of sufficient depth and width, typically 18" around bore path, to allow a dedicated spotter to clearly watch the drill head and back-reamer pass the utility. The shot cannot be drilled or bored until all existing utilities that cross the proposed bore path have been physically located and potholed, unless otherwise approved by the City.

11.8 Parallel Line Exposure Intervals: If the drill path runs parallel to an existing utility within its legally defined tolerance zone or the local clearance zone, the utility must be physically uncovered at the beginning and end of the bore, and at a minimum interval of every 50 feet along the parallel run. The utility must be physically uncovered every 25 feet when the drill path follows a curve or radius unless otherwise directed by the City.

11.9 Approved Excavation Methodologies: To comply with safety requirements and asset protection standards, vacuum excavation (such as hydro-excavation or air-knifing) is the only permitted method for exposing critical utility infrastructure, including gas lines, electric lines, or any other facilities deemed critical by the City. Vacuum excavation is also mandatory when locating utility lines beneath asphalt or concrete roadway pavements within the City of Hudson. Prior to approved potholing method in these areas, the contractor must core the pavement, and subsequent roadway repairs must be completed in strict accordance with City Standards. Potholes within the roadway shall be backfilled with #50 wet CLSM or MS concrete as approved by the City. Pavement replacement shall be completed by using a MS concrete cap that shall be dyed black to the depth of the existing pavement or as approved by the City. Joints of pavement replacement shall be sealed. Because many utility mains and the majority of service lines, including storm and sanitary laterals, are constructed of plastic (such as HDPE or PVC), the use

of mechanical backhoes and sharp metal hand tools are prohibited within the designated utility tolerance or safety envelope zone.

11.10 Pothole Dimensions & Maintenance: In non-pavement areas, utility inspection potholes shall be sized appropriately to fully expose the utility crossing, satisfying Subsurface Utility Engineering (SUE) Quality Level A criteria. This enables unobstructed visual confirmation of the 18-inch safety envelope and ensures a safe bore path, unless a variance is explicitly granted by the City. When active drilling is paused or at the conclusion of each workday, all open inspection windows must be safely secured with barricades or covered with structurally sound steel plating or heavy wood planking to allow drilling fluid pressure to vent safely without creating a public hazard.

11.11 Utility Installation Checklist: City inspection staff or the City's designated representative shall be required to complete the daily "City of Hudson Horizontal Directional Drilling / Trenchless Utility Installation Checklist" included in this specification. The Inspection Checklist shall document Maintenance of Traffic, OUPS tickets, and utility crossing potholes. The Inspection checklist shall be recorded for each day of work and submitted to the City prior to drilling commencement. Each utility that crosses the proposed bore or drill path must be physically verified by the inspector prior and logged prior to drilling operations commencing for the given area.

III. IN-FLIGHT MONITORING, RIG OPERATIONS & EMERGENCY CONTROLS (UTILITY STRIKE PROTOCOLS)

11.12 Inspection: The Contractor and/or Utility Owner shall be required to have all construction activities inspected by City inspection staff or the City's designated representatives. The Utility Owner shall be subject to inspection fees, established by the City, based upon current adopted rates. Cancellations made with less than one (1) hours' notice, or inspections cut short after work begins, will be billed under current City consultant rate schedules, including minimum billable hours. The Contractor and Utility Owner must coordinate daily with City inspection staff to communicate exact work locations. The Contractor shall remain fully responsible for complying with all project standards and specifications.

11.13 Interval Logging Requirements (Bore Logs): The Contractor shall actively monitor and record the horizontal and vertical coordinates (X, Y, and Z dimensions, including depth) of both the pilot drill head and the back-reamer at intervals not to exceed 10 feet. Bore logs should indicate where utility crossings occur and the depth at each crossing. These bore logs shall be maintained on-site and made available to the City upon request at any point during construction. Bore logs shall be made available in a digital format approved by the City. Additionally, the Contractor shall submit completed bore logs for all bore paths within the project area to the City prior to Final Completion.

11.14 Tracer wire: Tracer wire must be installed continuously with all utilities installed via Horizontal Directional Drilling (HDD). Upon completion, the contractor shall perform a continuity test to verify electrical integrity across the entire run. All tracer wires must terminate

inside accessible test stations, such as access boxes, vaults, handholes or pedestals, leaving a minimum of two feet of slack for utility locating equipment.

11.15 Zero-Tolerance for Field Alterations: The Contractor shall not deviate from the drill plan profile or alignment layout shown in the approved detailed construction drawings. If unknown obstacles require field adjustments, the Contractor must immediately stop drilling and obtain explicit written authorization from the City before proceeding.

11.16 Active Spotting Rules: When the drill head or reamer operates within the legal tolerance envelope of an existing utility, a dedicated field spotter (someone other than the machine operator) must be positioned over the pothole to actively watch the ground and tool passage to ensure a utility strike does not occur.

11.17 Remote Lockout Protection (Locator's Kill Switch): Verbal communication or hand signals are insufficient for strike mitigation. The crew member tracking the bore head must carry a fully operational wireless remote lockout device. This device must be capable of instantly disabling the drilling rig's fluid pumps, thrust mechanism, or other drilling operations, if a path deviation or hazard occurs.
Variances from this requirement may be accepted by the City. Prior to acceptance, the contractor shall have positively demonstrated the alternate method of drilling stoppage. Acceptable alternative safety methods that ensure constant, uninterrupted monitoring and mitigation may include:

A. Continuous, dedicated two-way radio communication between a dedicated spotter at the hazard site and the rig operator, where operation stops immediately upon any communication drop or halt signal.
B. Use of an electronic HDD locating system featuring pre-set audio and visual depth/distance proximity alerts.
C. Direct line-of-sight monitoring by a dedicated spotter at a physically exposed (potholed) utility window with direct control capability or instant radio contact to the operator.
D. Use of a fully functional, verified Electrical Strike Warning System (ESWS) combined with physical visual monitoring during critical utility passes.

11.18 Back-Reaming Protocol: The visual inspection, active spotting, and remote lockout protection rules remain in full effect during back-reaming and product pipe pullback. The larger diameter reamer bit must be actively monitored as it passes through every open pothole window.

11.19 Gas Strike Protocols: In the event that a gas strike occurs, the Contractor shall follow the procedure below:

A. Safeguard the area. Shut down all equipment immediately, do not attempt to remove equipment from the site. Ensure all residents and workers are clear from the site.
B. Call 911
C. Notify OHIO811
D. Notify the current gas utility owner emergency 24-hour service

E. Notify the City of Hudson Project Manager and/or Engineering Department at 330-342-1770

11.20 Other Utility Strike Protocols:

A. Call 911 if the utility strike poses a health or safety risk
B. Notify OHIO811
C. Notify the Utility Owner
D. Notify the City of Hudson Project Manager or Engineering Department at 330-342-1770

11.21 Electrical Strike Protocols: Rigs must deploy a tested, operational Electrical Strike Alert (strike alert) system connected to an isolated grounding stake. If an electrical line is struck, ground personnel must remain stationary, operators must remain on the isolated equipment deck, and no personnel may touch the machinery until the utility owner verifies the line is de-energized. All ground crew members must wear die-electric boots and gloves rated for the system hazards.

11.22 Hazardous Release Protocol: If a utility strike results in a hazardous release (gas leak, chemical spill, explosive threat), the contractor must immediately call 9-1-1, contact the utility asset owner and OHIO811, and take immediate action to protect people and the public.

11.23 Utility Damage Reporting: If any damage occurs, including minor structural scuffs, coating gouges, or tracer wire nicks, the contractor must immediately stop and report the type and location of damage to the utility company and OHIO811. Repairs must be inspected before the installation is backfilled.

IV. ENVIRONMENTAL CONTAIMENT & RESTORATION

11.24 Inadvertent Drill Fluid Return Containment: The Contractor must submit a site-specific HDD Contingency Plan. The plan must outline continuous monitoring of drilling fluid volumes and pressure losses. If an inadvertent return of drill fluid occurs, operations must cease immediately, containment booms must be deployed, and the return must be vacuumed to protect city storm systems and local waterways. The Contractor shall have a designated dump site included in the site-specific HDD Contingency Plan.

11.25 Restoration Requirements: All utility locating excavations, commonly referred to as pothole locations, must be backfilled and temporarily restored within seven calendar days of initial disturbance, unless otherwise approved by the City. All permanent surface, lawn, pavement, driveway, and public right-of-way restoration must be completed within 14 calendar days of the initial disturbance. Restoration work must strictly comply with Section 7 of the City of Hudson Engineering Standards for Restoration or as specified in the City's contract documents. Throughout any interim period, temporary stabilization must be maintained to prevent erosion and safeguard public safety.

11.26 Survey-Grade Precision Submissions: Final as-built record drawings must be submitted and meet requirements set forth herein. The Contractor shall record precise three-dimensional coordinates (X, Y, Z depth) at every utility crossing exposed during vacuum excavation using survey-grade GPS equipment. Hand-drawn red-line drawings are not acceptable. Any deviation in the bore path or in the placement of handholes or vaults from the bid set drawings shall be recorded using survey-grade GPS equipment and included in the final as-built record drawings. Datums for data collection shall be compatible with the City's GIS network and current survey standards. For City administered projects, as-built data collection and drawing preparation may be completed by City staff of their designated representatives at their direction.

11.27 GIS Integration Format: The Digital as-built files must be formatted in a manner approved by the City such that the file can be easily integrated into the City of Hudson's municipal GIS database.

V. NOTIFICATIONS, ADMINISTRATIVE ENFORCEMENT AND SANCTIONS

11.28 Permit Limits and Work Duration: To manage right-of-way impacts and public safety, the City may limit the number of active permits and the length of work zones assigned to any contractor or utility owner at one time (pursuant to municipal police powers and ORC Chapter 4939).

11.29 Public Notification: For non-city utility work, the contractor or utility owner must provide City-approved, written public notification to all abutting property owners at least ten (10) days prior to commencing work.

11.30 Immediate Stop Work Orders: Failure by the Contractor to adhere to any provision of this specification, including but not limited to drilling past an un-potholed crossing, operating without active remote lockout, or deviating from the approved 40-scale drill plan without written consent, shall result in an Immediate Stop Work Order issued by the City.

11.31 Permit Revocation and Financial Bonds: Continued non-compliance shall result in the immediate revocation of the utility's Right-of-Way occupancy permit and the forfeiture of all performance and restoration bonds to cover city remediation costs.

11.32 Pre-Construction and Progress Meetings: At the direction of the City, the Contractor or Utility Owner shall be required to schedule a pre-construction meeting with the City to be held no less than 48-hour prior to the start of the proposed work. The Contractor may also be required to hold progress meetings at the direction of the City.

VI. Service Drops, House Laterals and Service Connections

11.33 Service Connection and Shallow Lateral Verification: For any service drop, house lateral or service connection, the portion of installation within the public right-of-way shall follow all

requirements set forth hereinbefore. The portion of the service outside of the public right-of-way shall follow the below requirements:

For service drops, house laterals, and service connections installed via plowing or directional drilling at depths of 12 inches or less below grade, full SUE Quality Level A vacuum excavation of an 18-inch clearance window is not required due to depth constraints. Any installation deeper than 12 inches below grade shall not be considered a shallow installation and must comply with all standard potholing, clearance, and verification requirements set forth in this specification. For installations qualifying at 12 inches or less, the Contractor shall adhere to the following alternative verification criteria:

1. For all non-City related work, an approved City of Hudson Right-of-Way Permit is required prior to performing any work within the City's right-of-way or a public utility easement. Prior to any service installation in the Right-of-Way or utility easement, the contractor or service provider shall contact the City of Hudson Engineering Department to schedule inspection.

2. In accordance with OUPS (OHIO811) notification procedures and Ohio Revised Code (ORC) Section 3781.25 through Section 3781.32, all subsurface utility locations must be marked on the ground prior to installation. The Contractor shall avoid all mainlines, existing service drops, and private utilities crossings when planning for the new service/lateral install. The proposed lateral alignment shall be white painted or otherwise marked on the surface for the City inspector's review prior to installation.

3. When an existing access structure such as a vault, handhole or pedestal does not already exist at the point of connection, the main or distribution line must be physically exposed via vacuum excavation to visually verify the tie-in location and maintain required clearances from adjacent facilities. The point of connection and excavation shall take place a minimum of three (3) feet horizontally and 18 inches vertically from other existing facilities, such as gas mains, underground electric and fiber ducts, storm sewers, waterlines, and sanitary sewers, unless otherwise approved by the City. If the point of connection is located within three (3) feet of existing gas or electric lines and there is not an existing access structure, the Contractor shall vacuum excavate those critical facilities to ensure explicit clearance prior to commencing with the service or lateral installation.

4. Where a shallow lateral (12 inches or less in depth) crosses an existing marked utility, the Contractor must hand-dig (using a non-sparking tools) or utilize vacuum or hydro excavation to create a pot hole to exposure depth or to a minimum of 6 inches below the intended depth of the new lateral to establish physical visual clearance.

5. During shallow plowing or directional boring of service laterals, a dedicated spotter must walk the path directly above the mole, plow blade, or drill head to continuously monitor ground displacement and ensure no unmapped structures or shallow utilities are impacted.

6. All services shall be installed with tracer wire, unless otherwise approved by the City.

7. The City may permit deviations from these rules upon formal request and review of site-specific field conditions.

8. If a utility strike occurs, the contractor must immediately stop work, shut off all equipment, and safeguard the area to ensure the safety of all workers and residents. If a gas main or gas service lateral is struck, the contractor shall call 911 immediately. The contractor should contact the proper utility owner to make them aware of the utility strike.

9. Upon completion of the installation of the service connection or house lateral, the contractor shall complete restoration to all disturbed area. Restoration work must strictly comply with Section 7 of the City of Hudson Engineering Standards.

10. City inspection staff or the City's designated representative shall be required to complete the "City of Hudson Service/Lateral Installation Checklist".

City of Hudson

Horizontal Directional Drilling / Trenchless Utility Installation Checklist

Project: ____________________

Contractor: ____________________

Subcontractor: ____________________

Inspector: ____________________

Date: ____________________

1. Does the Contractor have an approved public right-of-way permit? Yes ☐ No ☐
2. Was OUPS called? Yes ☐ No ☐

OUPS Ticket No.(s) ____________________

3. Did the Contractor mark the proposed drill/bore path? Yes ☐ No ☐
4. Does it appear that all utilities have been marked? Yes ☐ No ☐

If a utility has not been marked, ensure the Contractor is following the proper escalation protocols to get the facilities marked. The Contractor shall not drill until all utilities have been marked and located.

5. Are all open excavations compliant with OSHA and City requirements? Yes ☐ No ☐
6. Are proper maintenance of traffic measures in place? Yes ☐ No ☐

Comments: ____________________

The Contractor must pothole each utility crossing via nondestructive excavation. The contractor cannot drill until each utility has been visually verified. While drilling the contractor must have a designated representative inspecting each pothole to ensure the drill path has not deviated and a utility strike does not occur.

<u>Notes:</u>

1: Inspector must locate all existing gas infrastructure including public and private lines and services and private gas well service lines.

2: Inspector shall ensure there are no conflicts with over head drops. Ensure all underground infrastructure is marked and located.

3: Inspector must locate private water lines or wells if present.

Utility Crossing Pothole Checklist

Address	Gas * See Note 1	Electric * See Note 2	Water * See note 3	Sanitary Sewer	Communication
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	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
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City of Hudson
Service/Lateral Installation Checklist

Address: _____

Contractor: _____

Inspector: _____

Date: _____

1. Did the Homeowner note that they had an invisible dog fence, irrigation system or private drainage system?

2. Is the invisible dog fence marked?	Yes	☐	No	☐	N/A ☐
3. Is the irrigation system marked?	Yes	☐	No	☐	N/A ☐
4. Is the drainage system marked?	Yes	☐	No	☐	N/A ☐
5. Was OUPS called?	Yes	☐	No	☐	

OUPS Ticket No.(s) _____

6. Did the Contractor mark the proposed service/lateral path?	Yes	☐	No	☐
7. Does it appear that all utilities have been marked in the R/W?	Yes	☐	No	☐
8. Is the location of the gas service known and/or marked?	Yes	☐	No	☐
9. Is the location of the electric service known and/or marked?	Yes	☐	No	☐
10. Is the location of the water service known and/or marked?	Yes	☐	No	☐
10. Are there any nearby private gas wells with service connections?	Yes	☐	No	☐

Provide a sketch of the service/lateral below. Include a north arrow, street, side streets, house, driveway, and any other necessary landmarks such as manholes, catch basins, hydrants, etc. Include offset distances from known landmarks.