VOLUME 15

Section 3: Trenching and Excavation

SECTION 3
TRENCHING AND EXCAVATION CONTENTS

1. UNDERGROUND FACILITIES STAKING REQUIREMENTS

1.1. PURPOSE

The purpose of this standard is to provide guidelines for the staking of utility installations in single-family, multiple resident, and commercial areas.

1.2. GENERAL

Utility staking is contingent upon the completion of the following by the Applicant:

1.2.1. Clearing and cutting streets, sidewalks, and utility easements (if in public ROW), to subgrade.

1.2.2. Establishment of lot corners or an offset for protection and finished street, curb, and sidewalk grades where required.

1.3. STAKING PROCEDURE

The Applicant is to provide and maintain the staking in the following order.

1.3.1. **Subgrade Stakes:** These indicate the offset and grade cut or fill at the following locations as appropriate:

1.3.1.1. Property corners (none on apartments and townhouses)

1.3.1.2. Lot pad corners (none on apartments and townhouses)

1.3.1.3. Building corners (none on lot sale developments)

1.3.1.4. Other locations as required.

Subgrade stakes are generally correct to within 0.3 feet, which is sufficiently precise to stake subgrade. However, care must be exercised when staking a utility location in that a greater degree of precision may be necessary.

1.3.2. It is the Applicant's responsibility to see that finish grade is staked, in all areas back of sidewalk, where there will be utility installations. If the finish grade is not provided, the minimum trench depth in the unstaked area will be 75" - 80".

1.3.3. **Curb and Gutter Stakes:** These stakes indicate the offset and grade cut or fill, normally to top of curb. They are set with greater precision and are generally correct to within 0.02 feet.

1.3.4. Final Lot Corners: These are not normally staked until all construction is complete and are of little use in staking of underground utilities.

1.4. NV ENERGY / APPLICANT COORDINATION

When approaching the task of providing utilities for a proposed development, the following is normally required.

1.4.1. UDA reviews information with the applicant.

1.4.2. Applicant reviews plans with NV Energy, UDA, at pre-construction meeting.

1.4.3. If NV Energy does surveying, NV Energy's Operating Department checks and releases the project for staking.

1.4.4. The Applicant provides the staking and grading necessary for utility installation.

1.4.5. UDA or operating personnel and applicant review plans at the project site.

1.4.6. Check applicable standard street improvements for City of Reno, City of Sparks, Washoe County, and/or Storey County and compare with project plans.

1.4.7. Before staking, the applicant shall confirm the location of property corners to ensure that they conform to the proper established street ROW widths.

1.5. GAS STAKING DETAILS

1.5.1. Offset Distance: An offset distance, from C/L of trench, shall be selected which will ensure the protection of stakes during trenching. The stakes are normally placed adjacent to the applicant's curb and gutter stakes, which provides an adequate offset.

1.5.2. Interval: Stakes will be placed at or near the property corners or at 50 foot intervals. However, the interval may have to be decreased to 25 feet or less on curves or where the site conditions otherwise dictate.

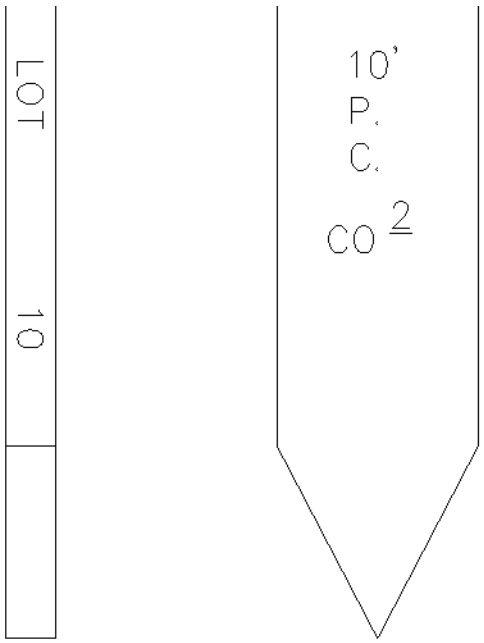
1.5.3. Stake Lettering: Given below is an example of typical stake information necessary for utility installation.

1.5.3.1. Distance to centerline of gas trench "C/L Gas 10"'

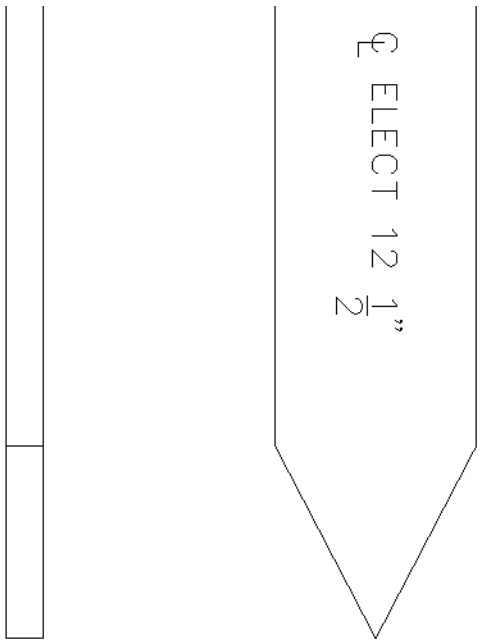
1.6. APPLICANT RESPONSIBILITIES

1.6.1. Maintenance and Adjustments: *The Applicant is responsible for maintenance of all stakes and adjustments of all boxes and pads to proper grade.*

1.7. EXAMPLES OF STAKE LETTERING



EXAMPLE 1



EXAMPLE 2

2. TRENCHING AND EXCAVATION SAFETY REQUIREMENTS

2.1. PURPOSE

The purpose of this standard is to outline OSHA requirements as they apply to excavations for NV Energy's underground facilities. Facility installation will not be accepted and NV Energy's field personnel will not participate in the facility installation if these OSHA requirements are not adhered to. The Contractor will have a competent person on-site at all times during any excavation and trenching operations and is responsible for the compliance of the requirements set forth by OSHA.

2.2. GENERAL

2.2.1. Prior to opening an excavation, all other utility companies must be contacted, **(Underground Service Alert (USAN) 811)** to determine if conflicting installations will be encountered, and if so, their location, depth, etc.

2.2.2. Surface encumbrances, such as trees, boulders, or construction materials that may create a hazard to persons working on or in excavations, must be made safe before excavation is begun.

2.2.3. Excavated material, from excavations which persons are required to enter, must be stored at least 2 feet from the edge of the excavation or effectively retained by the use of barriers.

2.2.4. The walls and faces of all excavations in which persons are exposed to danger from moving ground shall be guarded by a shoring system, sloping off the ground, or some other equivalent means. Supporting systems shall be designed by a qualified person and meet accepted engineering requirements. Determination of the slope angle or design of the shoring system shall be based on such factors as excavation depth, anticipated changes of the material from exposure or surface loading due to equipment, traffic vibrations, or excavated materials (See Table I for sloping requirements and Tables II, III, and IV for minimum shoring requirements).

2.2.5. Materials used for shoring shall be in good serviceable condition, with timbers sound, and free from large or loose knots, and of proper dimensions.

2.2.6. Excavations below the level of the base footing of any foundation or wall shall not be permitted unless the wall is underpinned and other precautions are taken to ensure the stability of adjacent walls.

2.2.7. Water shall not be allowed to accumulate in an excavation. Diversion ditches, dikes, etc., shall be used to prevent the entrance of surface water and to provide drainage of the adjacent area.

2.2.8. Dust conditions shall be kept to a minimum by the use of water or other means.

2.2.9. Ladders used in excavations shall be in accordance with the OSHA subpart concerning the subject (Part 1926, Subpart "X").

2.3. SPECIFIC TRENCHING REQUIREMENTS

2.3.1. When persons are required to enter trenches, 4 feet or more in depth, an adequate means of exit, such as a ladder or steps, shall be provided and located to require no more than 25 feet of lateral travel.

2.3.2. Trenches in soft or unstable soil, 5 feet or more in depth, must be sloped, shored, or otherwise supported by means of sufficient strength to protect persons working in them.

2.3.3. Trenches in hard or compact soil, 5 feet in depth and 8 feet or more in length, shall be shored or the trench sides above the 5 foot level sloped to be not steeper than 1 foot vertical to each 1/2 foot horizontal.

2.3.4. Trenches less than 5 feet deep shall also be protected when examination of the ground indicates hazardous ground movement may be expected.

2.3.5. Additional precautions, by way of shoring and bracing, shall be taken to prevent slides or cave-ins when trenches are dug in locations adjacent to backfilled areas or are subjected to vibration from railroad or highway traffic, the operation of machinery, or any other sources

2.3.6. Bracing or shoring of trenches shall be carried along with the excavation.

2.3.7. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kick outs.

2.3.8. Portable trench boxes or sliding shields may be used, in lieu of a shoring system or sloping. The boxes or shields must be designed, constructed, and maintained in a manner equal to or greater than the shoring system required for the trench.

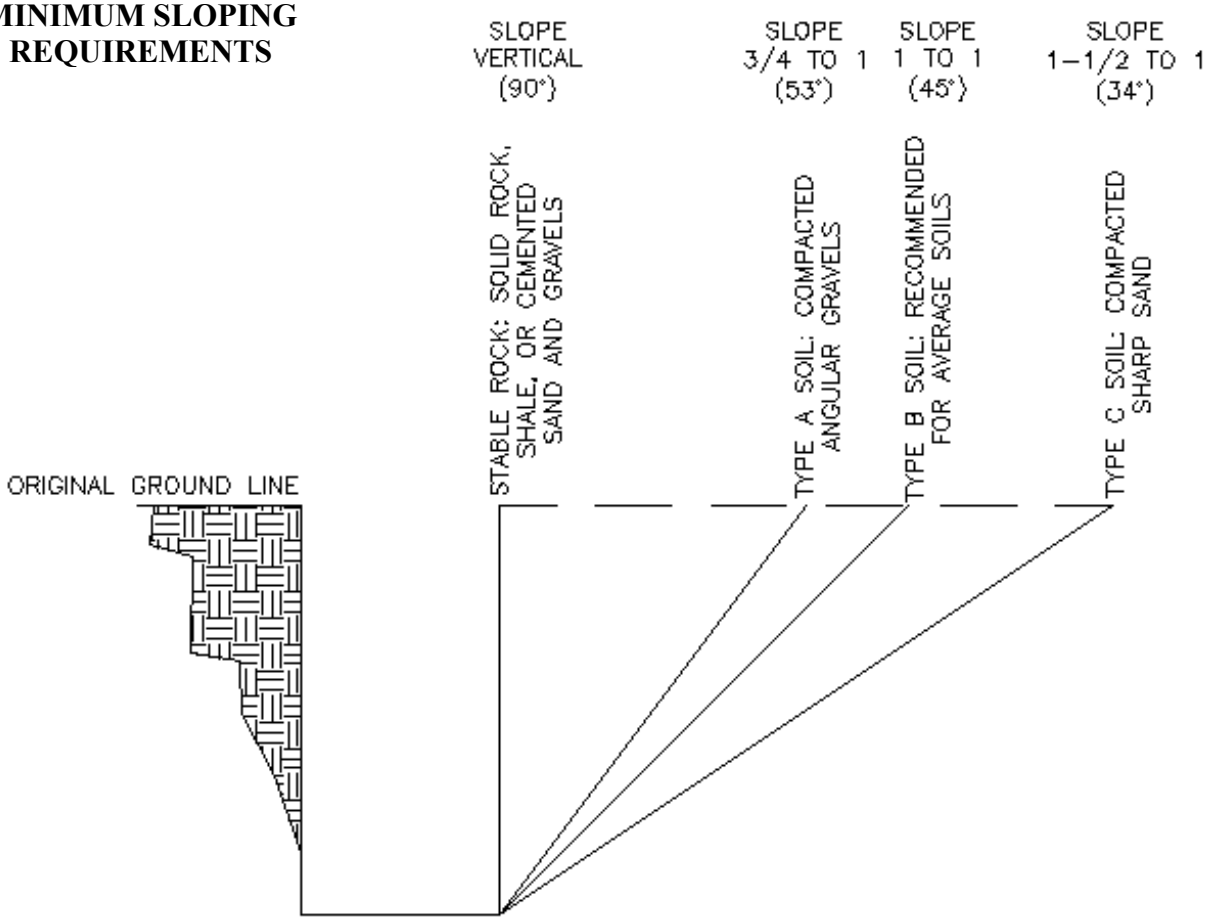
2.3.9. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces, from above, when all personnel have cleared the trench.

2.4. REFERENCES

Construction Safety and Health Regulations, Part 1926, Subpart "P".

The contractor must comply with the trenching and excavation requirements of 29 CFR 192.651 and 192.652 or comparable OSHA approved state plan requirements.

TABLE I
MINIMUM SLOPING REQUIREMENTS



NOTES:
1. SLOPES ARE MAXIMUM ALLOWABLE SLOPE FOR GIVEN SOIL TYPE AND EXCAVATIONS LESS THAN 20 FT DEEP. SEE 29 CFR PART 1926 SUBPART P FOR FURTHER DETAILS.
2. A SHORT TERM SLOPE OF 1/2 TO 1 (63°) IS ALLOWED FOR TYPE A SOILS IN EXCAVATIONS 12 FT OR LESS IN DEPTH.

SHORING TABLES: Consult OSHA guidelines for detailed requirements on various types of shoring

TABLE II

ALUMINUM HYDRAULIC SHORING (WITHOUT WALERS) TYPE "A" & "B" SOILS					
Depth of Trench (feet)	Hydraulic Cylinders				
	Maximum Horizontal Spacing (feet)	Maximum Vertical Spacing (feet)	Width of Trench (feet)		
			Up to 8	Over 8 up to 12	Over 12
Over 5 up to 10	8 (type "A" & "B" soil)	4	2 inches in diameter	2 inches in diameter with 3.5 inches over sleeve	3 inches in diameter
Over 10 up to 15	8 (type "A" soil)				
	6.5 (type "B" soil)				
Over 15 up to 20	7 (type "A" soil)				
	5.5 (type "B" soil)				
NOTE: Type "C" soil can only be protected by sloping, waler system or protective box unless "C60" see manufacturer's tabulated data					

TABLE III

ALUMINUM HYDRAULIC SHORING WITH WALERS TYPE "B" SOIL											
Depth of Trench (feet)	Wales		Hydraulic Cylinders						Timber Uprights		
	Vertical Spacing (feet)	*Section Modulus (in^3)	Width of Trench (feet)						Max Horiz. Spacing on Center		
			Up to 8		Over 8 up to 12		Over 12 up to 15		Solid Sheet	2 feet	3 feet
			Horiz. Spacing	Cylinder Diameter	Horiz. Spacing	Cylinder Diameter	Horiz. Spacing	Cylinder Diameter			
Over 5 up to 10	4	3.5	8.0	2 in	8.0	2 in with 3.5 in over sleeve	8.0	3 in	-	-	3x12
		7.0	9.0	2 in	9.0		9.0	3 in			
		14.0	12.0	3 in	12.0	3 in	12.0	3 in			
Over 10 up to 15	4	3.5	6.0	2 in	6.0	2 in with 3.5 in over sleeve	6.0	3 in	-	3x12	-
		7.0	8.0	3 in	8.0	3 in	8.0	3in			
		14.0	10.0	3 in	10.0	3 in	10.0	3 in			
Over 15 up to 20	4	3.5	5.5	2 in	5.5	2 in with 3.5 in over sleeve	5.5	3 in	3x12	-	-
		7.0	6.0	3 in	6.0	3 in	6.0	3 in			
		14.0	9.0	3 in	9.0	3 in	9.0	3 in			
*Over 20 feet consult Manufacturer Tab Data or qualified engineer for Section Modulus of available wales.											

TABLE IV

ALUMINUM HYDRAULIC SHORING WITH WALERS TYPE "C" SOIL											
Depth of Trench (feet)	Wales		Hydraulic Cylinders						Timber Uprights		
	Vertical Spacing (feet)	*Section Modulus (in^3)	Width of Trench (feet)						Max Horiz. Spacing on Center		
			Up to 8		Over 8 up to 12		Over 12 up to 15		Solid Sheet	2 feet	3 feet
			Horiz. Spacing	Cylinder Diameter	Horiz. Spacing	Cylinder Diameter	Horiz. Spacing	Cylinder Diameter			
Over 5 up to 10	4	3.5	6.0	2 in	6.0	2 in with 3.5 in over sleeve	6.0	3 in	3x12	-	-
		7.0	6.5	2 in	6.5		6.5	3 in			
		14.0	10.0	3 in	10.0	3 in	10.0	3 in			
Over 10 up to 15	4	3.5	4.0	2 in	4.0	2 in with 3.5 in over sleeve	4.0	3 in	3x12	-	-
		7.0	5.5	3 in	5.5	3 in	5.5	3in			
		14.0	8.0	3 in	8.0	3 in	8.0	3 in			
Over 15 up to 20	4	3.5	3.5	2 in	3.5	2 in with 3.5 in over sleeve	3.5	3 in	3x12	-	-
		7.0	5.0	3 in	5.0	3 in	5.0	3 in			
		14.0	6.0	3 in	6.0	3 in	6.0	3 in			
*Over 20 feet consult Manufacturer Tab Data or qualified engineer for Section Modulus of available wales.											

3. TRENCH BEDDING & BACKFILL

3.1. PURPOSE

This specification provides the requirements and standards for bedding of pipes, and for trench backfill materials and construction procedures, including testing and inspection.

3.2. GENERAL

3.2.1. Standard Test Methods: The following standard test methods of the American Society for Testing and Materials (ASTM) form a part of this specification and are referred to herein by alphanumeric designation.

ASTM DESIGNATION	TITLE
C136	Sieve Analysis of Fine and Coarse Aggregates
D423	Liquid Limit of Soils
D424	Plastic Limit and Plasticity Index of Soils
D1556	Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2700 kN-m/m3))
D2419	Sand Equivalent Value of Soils and Fine Aggregate
D2844	Resistant R-Value and Expansion Pressure of Compacted Soils
D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

3.2.2. Substitute Test Method: Where local practice prescribes revised test methods for the ASTM tests listed above, those tests may be substituted for the ASTM designated test method listed upon prior approval from NV Energy.

3.2.3. Material Sources:

3.2.3.1. **New Sources:** The contractor or applicant, at their own expense, shall have any bedding and backfill materials from sources previously undeveloped, or unfamiliar to NV Energy, tested and certified by an approved, independent materials testing laboratory, per these specifications.

3.2.3.2. **Existing Sources:** Bedding and backfill materials from sources previously developed and familiar to NV Energy may be accepted without testing and certification upon written request by the contractor or applicant. NV Energy reserves the right to determine the acceptability of all materials proposed for use.

3.3. MATERIALS

3.3.1. Class A Gas Pipe Sand Bedding: Material shall be free of ice, clay, organic matter, or other objectionable material, and shall conform to the following standards:

3.3.1.1. **Gradation per ASTM C136:**

SIEVE SIZE	PERCENT BY WEIGHT PASSING SIEVE
3/8 "	100
# 4	90-100
# 50	10-40
#100	3-20
#200	0-15

3.3.1.2. **Sand Equivalent per ASTM D2419:** 25 minimum

3.3.1.3. **Plasticity Index per ASTM D4318:** Non-Plastic

3.3.1.4. **Moisture - Density per ASTM D1557:** Max. +2% of optimum, Min. -5% of optimum

3.3.1.5. Any gas pipe sand bedding material retained on a #4 sieve shall not contain more than 30% angular material as described in ASTM D2488. Gas pipe sand bedding material which contains sub angular, sub rounded or rounded material, and conforms to Sections 3.3.1.1 and 3.3.1.2 is acceptable.

CRITERIA FOR DESCRIBING ANGULARITY

Angular: Particles have sharp edges and relatively plane sides with unpolished surfaces. Examples include particles which resemble arrowheads.

Sub angular: Particles are similar to angular description but have rounded edges.

Sub rounded: Particles have nearly plane sides but have well-rounded corners and edges.

Rounded: Particles have smoothly curved sides and no edges.

ANGULAR **SUBANGULAR**

SUBROUNDED **ROUNDED**

3.3.2. Type II Class B Aggregate Base, Road Base: Type II shall be a crusher-run, mineral aggregate free of ice, clay, organic matter, or other objectionable material, and shall conform to the following standards:

3.3.2.1. **Gradation per ASTM C136:**

SIEVE SIZE	PERCENT BY WEIGHT PASSING SIEVE
1"	100%
3/4"	90-100%
# 4	35-65%
#16	15-40%
#200	2-10%

3.3.2.2. **Liquid Limit per ASTM D423:** 35 maximum

3.3.2.3. **Plasticity Index per ASTM D424:** Maximum Allowable Plasticity Index (PI) shall be determined by the formula: PI = 15 - (S x 100) where "S" is the percent by weight passing through the #200 sieve.

3.3.2.4. **Resistance R-Value per ASTM D2844:** 70 minimum

3.3.3. Class C Backfill, ¾" Minus Clean Drain Rock: Class C backfill shall be free of any organic impurities, clay lumps, or unstable substances. The material shall be graded from 3/4" to 3/8" conforming to the following gradation:

3.3.3.1. **Gradation per ASTM C136:**

SIEVE SIZE	PERCENT BY WEIGHT PASSING SIEVE
1"	100%
3/4"	90-100%
3/8"	10-55%
#4	0-10%

** 5 % of pan material will be allowed.

3.3.3.2. **Liquid Limit per ASTM D423:** 35 maximum

3.3.3.3. **Plasticity Index per ASTM D424:** Maximum Allowable Plasticity Index (PI) shall be determined by the formula: PI = 15 - (S x 100) where "S" is the percent by weight passing through the #200 sieve.

3.3.3.4. **Resistance to Wear per ASTM C131:** 37 maximum

3.3.4. Native Backfill: Native backfill shall be excavated native granular material free of ice, clay, debris, organic matter, and rocks larger than 4" across their greatest dimension.

3.3.5. Substitute Material: Substitute bedding and backfill materials may only be used if prior written approval from NV Energy is received. In requesting the use of a substitute material, the contractor or applicant must submit adequate evidence that the material has been successfully used in similar applications for other utilities or local governmental agencies.

Exceptions: Rockshield or an equivalent product may be used to protect gas pipe during backfilling directly against a pipe with material that does not meet these standards (such as pea gravel) if the installation environment requires it. However, care must be taken to prevent damage to the pipe while backfilling. The use of Rockshield is at the NV Energy gas inspector's discretion and is not intended for typical installations.

3.4. CONSTRUCTION

3.4.1. Trench Configuration: Trench configurations shall conform to NV Energy's Trench Excavation Standards.

3.4.2. Material Installation/Repair: Pipes and all apparatus shall be handled, installed, and joined in accordance with NV Energy's construction standards, and the manufacturer's specifications or recommendations. The contractor or applicant, at their own expense, shall repair or replace any pipes or appurtenances damaged during bedding and backfill operations.

3.4.3. Sand Bedding: Sand bedding material conforming to Section 3.3 shall be placed in 12" maximum loose lifts and compacted to 90% maximum density per ASTM D1557. The sand bedding shall be installed in a manner that provides at least 6" of firm support under gas facilities and prevents damage to the pipe or pipe coating from equipment or from the backfill material.

At a minimum, 12" of sand bedding shall be placed above and on the sides of any gas main, service tee, service laterals, fitting or other gas carrying components before mechanical compaction can begin directly above. All compaction of sand bedding shall be completed using hand-operated, plate-type, vibratory, or other suitable hand-tampers only. Use of large mechanical compaction equipment, such as rollers, sheeps foot, or similar, is prohibited until there is a minimum of 12" compacted sand bedding. The minimum 12" of compacted sand can be achieved by using and compacting multiple loose lifts, each with a maximum height of 12". Multiple lifts must be used to ensure proper compaction and because loose lifts will lose height as they are compacted. Refer to 4.3.4 for addition details on trench width standards.

3.4.4. Backfill:

3.4.4.1. **Public Rights-of-Way:** Trenches in established streets, highways, or private paved areas subject to vehicular traffic shall be backfilled with crushed gravel, conforming to section 3.3.2, and shall be placed in 12" maximum loose lifts and compacted per ASTM D1557. The top two lifts shall be compacted to 95% maximum density and shall extend a minimum of 12" below finish grade. The area above the sand bedding and below 12" from finish grade shall be compacted to 90% maximum density. Applicants or the engineer of record are responsible for required compaction tests. Local agencies whose ordinances require compaction in excess of 90% shall prevail.

3.4.4.2. **Private Property:** The area from finish grade to 12" above the pipe in trenches in private property and areas not subject to vehicular or pedestrian traffic may be backfilled with native material conforming to section 3.3 and shall be placed in 12" maximum loose lifts and compacted to 80% maximum density per ASTM D1557. Local agencies whose ordinances require compaction in excess of 80% shall prevail.

3.4.4.3. **Utility Easements:** Trenches in utility easements which shall be overlain with vaults, transformers, or similar equipment shall be backfilled in accordance with Section 3.4.4.1.

3.4.5. Compaction: All compaction shall be by hand-operated, plate-type, vibratory, or other suitable hand-tampers in areas not accessible to larger rollers or compactors. Extreme care shall be taken to avoid damage to pipes and any appurtenances. The use of large mechanical compaction equipment is permitted as long as the top of the gas facility is protected with at least 12" of compacted sand bedding. Backfill shall be moistened as required to obtain compaction but water densification by inundation or jetting shall not be permitted without prior written approval from NV Energy.

3.4.6. Trench Dewatering: Where groundwater is encountered, the contractor or applicant shall dewater the trench sufficiently to meet the bedding and backfill requirements of sections 3.4.3 and 3.4.4. Dewatering shall continue until backfill has progressed to a minimum of 2 feet above the groundwater level. NV Energy gas inspector(s) may require drain rock (3/4" minus) in addition to the bedding depending on condition of trench bed.

3.4.7. Finish Operations:

3.4.7.1. **Fine Grading:** After backfilling, all trenches except those in existing paved areas shall be graded flush with adjacent finish or subgrade elevations.

3.4.7.2. **Temporary Patching:** Unless otherwise specified, all pavement cuts shall be temporarily patched with asphaltic concrete to a minimum depth of 2", with the finish grade 1/2" above the grade of the existing asphalt.

3.4.7.3. **Disposal of Excess Materials:** Surplus excavated soils, asphalt pavement, concrete and other debris shall be promptly removed from the jobsite and properly disposed of.

3.5. FIELD SAMPLING AND TESTING

3.5.1. Materials Testing: The contractor or applicant, at their own expense, shall retain the services of an approved, independent materials testing laboratory to perform the following tests.

3.5.1.1. **Moisture-Density Relations:** The sand bedding, crushed gravel, and native backfill materials shall be tested for moisture density relations per ASTM D1557, Method D. Test locations will be randomly selected by NV Energy.

3.5.1.2. **Density Tests:** The sand bedding, crushed gravel, and native backfill materials shall be tested for density per ASTM D1556 or D2922. Test locations will be randomly selected by NV Energy. The following frequencies shall apply:

- **Sand Bedding:** Tests shall be made at a minimum of one test per lift per 500 linear feet of trench.
- **Crushed Gravel Backfill:** Tests shall be made at a minimum of one test per lift per 500 linear feet of trench.

3.5.1.3. Tests will be reported by specific location such that the test location can be identified.

3.5.2. Retesting: If any test conducted per Sections 3.5.1.1 and 3.5.1.2 fails, the area shall be re-compacted and two additional tests shall be performed. Test locations will be randomly selected by NV Energy at installer cost.

3.5.3. Reporting: The results of all tests shall be submitted to NV Energy within 24 hours after the completion of the test.

3.5.4. Exceptions: At remote locations or for small installations, as determined by NV Energy, the sampling and testing procedures in Section 3.5 may be waived by NV Energy. Such waiver in no way relieves the contractor or applicant from meeting the requirements of the remaining sections of this specification.

4. TRENCH EXCAVATION STANDARDS

4.1. PURPOSE

The following Standards provide trench configurations, general requirements, and guidelines for trenching and excavation for gas facility installations within NV Energy service territory.

4.2. GENERAL

The trench is a critical and integral part of the gas installation. Trenching must be completed in a professional manner and **must meet all applicable** City, County, State, and Federal specifications in addition to the requirements of this standard. In the case of a conflict, the more rigid specification or standard shall apply.

4.3. TRENCHING GUIDELINES

4.3.1. Trenching Configurations: Trench configuration drawings attached as part of this standard are the typical configurations used by NV Energy. In cases where a typical configuration does not apply, a trench section drawing shall be provided to the contractor or applicant showing necessary dimensions and details. The following general rules apply to all trenches:

4.3.1.1. **Backfill:** The top 12" minimum of all trenches in streets, highways, or other paved areas shall be backfilled with Type II base compacted to 95% maximum density in accordance with 3.4.4.1.

4.3.1.2. **Bedding:** Sand bedding compacted to 90% maximum density shall be placed a minimum of 12" above and on both sides of all gas pipes; A minimum of 6" shall be placed below all gas pipes.

4.3.1.3. **Backfill Option:** Either Type II or sand bedding material may be used for backfill material in the trench area between 12" above the pipe, and 12" below finish grade. In either case, the material shall be compacted to 90% maximum density in accordance with section 3.4.4.1.

4.3.1.4. **Warning Tape:** Warning tape shall be placed in all trenches at least 12" below finish grade and/or 12" above NV Energy pipe. Yellow warning tape shall be used for gas facilities.

4.3.2. Trench Locations: Trench locations are typically shown relative to street centerlines, right-of-way lines, or property lines in new and existing developments. It is the responsibility of the contractor or the applicant to verify that these reference lines are established and accurate. Where such references are unavailable, alignment shall be established by NV Energy.

4.3.3. Trench Depth: Depths shown in the standard trench configurations are minimums. For trenches which fall on a side slope, the depth shall be measured from the low side.

4.3.4. Trench Width: Trench width at road grade may vary based on sloping requirements. Trench width at pipe grade shall allow for at least 12" of clearance between the pipe and trench wall on either side of the pipe to allow for proper backfilling with sand. Deviations from this requirement are up to the NV Energy gas inspector's discretion.

4.3.5. Dewatering: Where ground water is encountered during trench excavation, it shall be the responsibility of the contractor or applicant to adequately dewater the trench to provide for safe and convenient installation of pipe. See Section 3.4.6 of this standard for details.

4.3.6. Other Utilities/Facilities

4.3.6.1. **Joint Trenches:** Joint trench construction of gas mains shall be by mutual agreement of all parties involved. Coordination of separate utility/facility installations in a joint trench shall be by the contractor or the applicant.

4.3.6.2. **Applicant facilities:** Applicant facilities (except fuel/sewage/leach lines) may be installed in a joint trench with a gas main if:

- Approved by all the utilities involved,
- All clearances are met, and
- Occurs on private property.

No applicant facilities will be allowed in joint trenches in franchised right-of-ways.

Gas Service lines shall not be installed in common trench with water lines on private property.

Minimum radial clearance for conductive pipe installed in parallel in a joint trench with steel gas pipe shall be the greater of 12" or 2 and ½ times the diameter of the larger facility. Exceptions or deviations from these requirements must be approved by NV Energy Gas Engineering.

4.3.6.3. **Existing Utilities:** Prior to commencement of excavation, the contractor or applicant shall contact the Underground System Alert (USAN) 811. After existing utilities have been located, extreme caution shall be exercised while excavating in their vicinity. Once exposed, pipes shall be shored or supported as necessary to prevent damage. The full cost of repair or replacement of damaged utilities shall be borne by the contractor or applicant.

4.3.7. Installation Procedures: Pipes shall be installed in the trench, in accordance with the manufacturer's recommended procedures, NV Energy Specifications, and/or Standards and accepted practices.

4.3.8. Bedding and Backfill: Pipes shall be bedded, and trenches backfilled, in accordance with Part 3 of this section. Trenches should be backfilled the same day as pipe is installed.

4.4. SAFETY

4.4.1. Responsibility: The contractor or applicant shall be responsible for initiating, maintaining, and supervising all safety precautions in connection with the implementation of these standards, and shall comply with all applicable laws, rules, and regulations of any public authority relative to the safety of persons or property, or their protection from damage, injury, or loss.

4.4.2. Shoring or Sloping: When applicable, trenches shall be shored or their sides slopped, in accordance with part 2 of this section, and Federal Occupational Safety and Health Act (OSHA) requirements.

4.4.3. Excavated Material: Soil and rock from the trench excavation shall be placed no closer than 24" to the edge of the trench.

4.4.4. Protective Gear: All construction workers shall have adequate protective gear including, but not limited to, hard hats, gloves, goggles, respirators, boots, etc.

4.4.5. Tools and Equipment: All construction workers shall be provided with safe, adequate, and well-maintained tools and equipment, including ladders for trench ingress and egress, in accordance with OSHA requirements.

4.5. ENVIRONMENTAL

"In an effort to reduce pollution of Waters of the United States and comply with all requirements as identified in Title 40 Code of Federal Regulations Part 122.26, the following activities will be the sole responsibility of the contractor: Storm water Discharges associated with Construction Activities, Storm water Discharges associated with Small Construction Activities, and Storm water discharges associated with Industrial Activities. All contractors working on behalf of NV Energy or its affiliates will be responsible for the following activities: Filing the Notice of Intent (NOI) with the Nevada Division of Environmental Protection (NDEP), completing a storm water Pollution Prevention Plan (SWPPP), providing SWPPP training for applicable personnel, implementing Best Management Practices (BMPs), fulfilling requirements of monitoring, inspections, documentation, and completion of a Notice of Termination (NOT) upon the conclusion of the project. **Any fines, fees, or levies incurred due to incomplete, inadequate, or improper management of the Storm water Program will be the responsibility of the contractor.** The contractor must also comply with any and all City and County municipal codes and ordinances which grant authority to prohibit pollutants and waste from being deposited on streets and public places, prohibit non-storm water discharges to the storm drain system, and comply with provisions for protecting hillsides from erosion, sedimentation, or vegetation loss during new development."

5. TYPICAL TRENCH DETAILS

ALL TRENCHES MUST BE APPROVED BY NV ENERGY FIELD REPRESENTATIVE PRIOR TO ANY CONSTRUCTION

5.1. GENERAL INFORMATION

5.1.1. All trenches must conform to the latest applicable NV Energy, city, county, state, federal, and OSHA specifications and requirements. In the case of conflict, the more rigid specification or standard shall apply. For environmental requirements refer to 4.5.

5.1.2. Native material requires 80% compaction. Refer to 3.4.4.2.

5.1.3. Sand requires 90% compaction.

5.1.4. Type II aggregate base requires 95% compaction for at least the top 12". Refer to 3.4.4.

5.1.5. The top 12" minimum of all trenches in established highways, streets, and other paved areas subject to traffic, shall be backfilled with Type II base. Refer to 4.3.1.

5.1.6. The area from finish grade to 12" above the pipe of all trenches on private property, (not subject to traffic) may be backfilled with native material. Refer to 3.4.4.

5.1.7. No conduits shall be installed above or parallel to gas lines.

5.1.8. Nonmetallic yellow warning tape will be 6" wide, marked "NV Energy Utilities Buried Below" and shall be placed in all trenches at least 12" below finish grade and/or 12" above NV Energy facilities.

5.1.9. Primary electric and gas shall not occupy the same common trench and shall be separated by virgin soil during parallel installations.

5.1.10. Gas mains shall have appropriate clearance from the sides of the trench per 4.3.4.

5.1.11. Gas **Services** shall have depth to top of pipe of 24" in private property and 30" in streets and roads.

5.1.12. Gas **Mains** shall have depth to top of pipe of 36" in State Highways; 30" in streets or roadways; 24" in private property; and maintain a minimum radial clearance of 12” from all other utilities. Minimum radial clearance for conductive pipe installed in parallel in a joint trench with steel gas pipe shall be the greater of 12” or 2 and ½ times the diameter of the larger facility. Exceptions or deviations from these requirements must be approved by NV Energy Gas Engineering.

	Depth Required		
Type of Installation	**Private Property**	**Streets or Roadways**	**State Highways**
Main	24”	30”	36”
Service*	24”	30”	

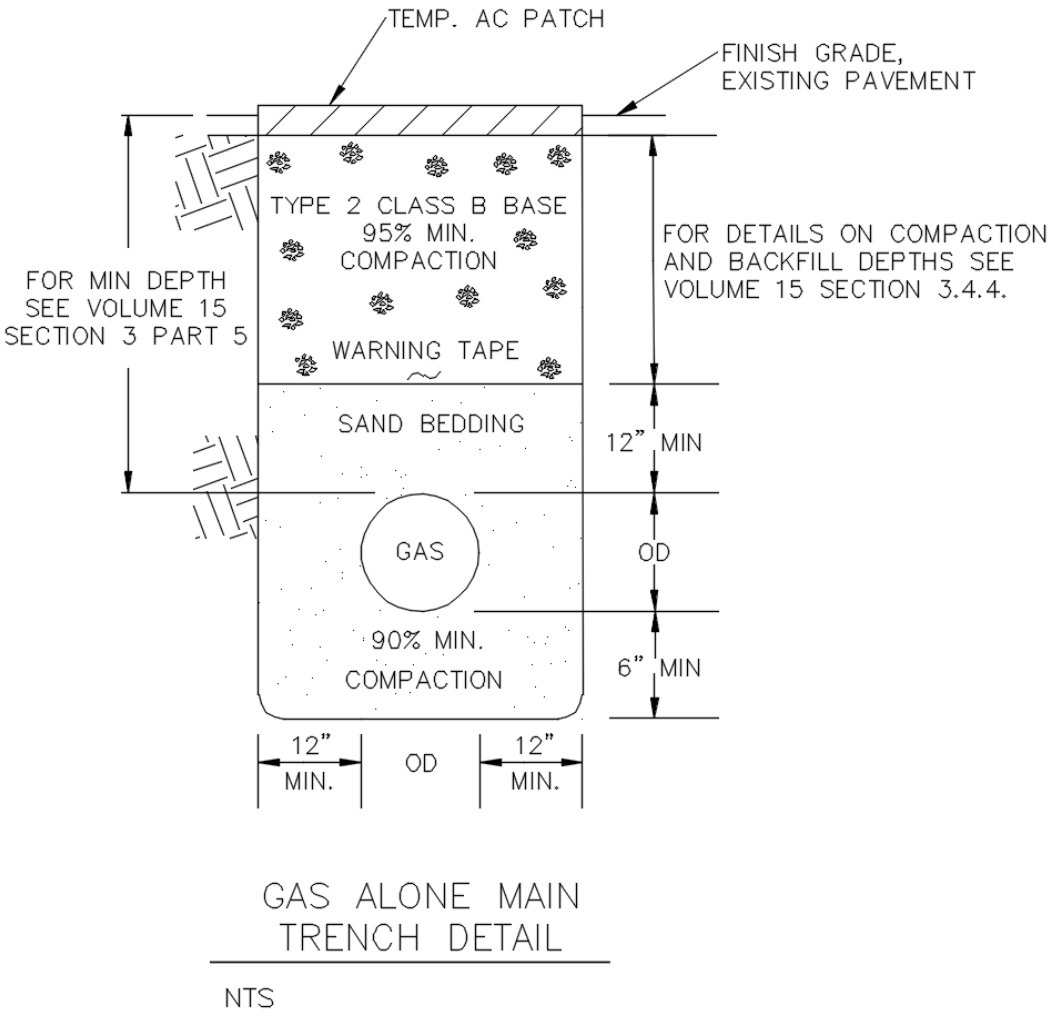
*Depth of services at the main may vary due to service tee height. Depth shall return to specified depth as soon as possible.

5.1.13. Sewer (SS) and Storm Drain (SD) must maintain a 24” radial clearance from NV Energy Gas facilities. Any exceptions/deviations from these requirements must be approved by the appropriate NV Energy Engineering Department.

5.1.14. SS/SD (Sanitary Sewer/Storm Drain) shall not occupy the same common trench as gas and will be separated by virgin soil during parallel installations.

5.1.15. If field changes are required, all changes must be approved by the NV Energy gas inspector.

5.2. TYPICAL GAS ALONE MAIN TRENCH DETAIL

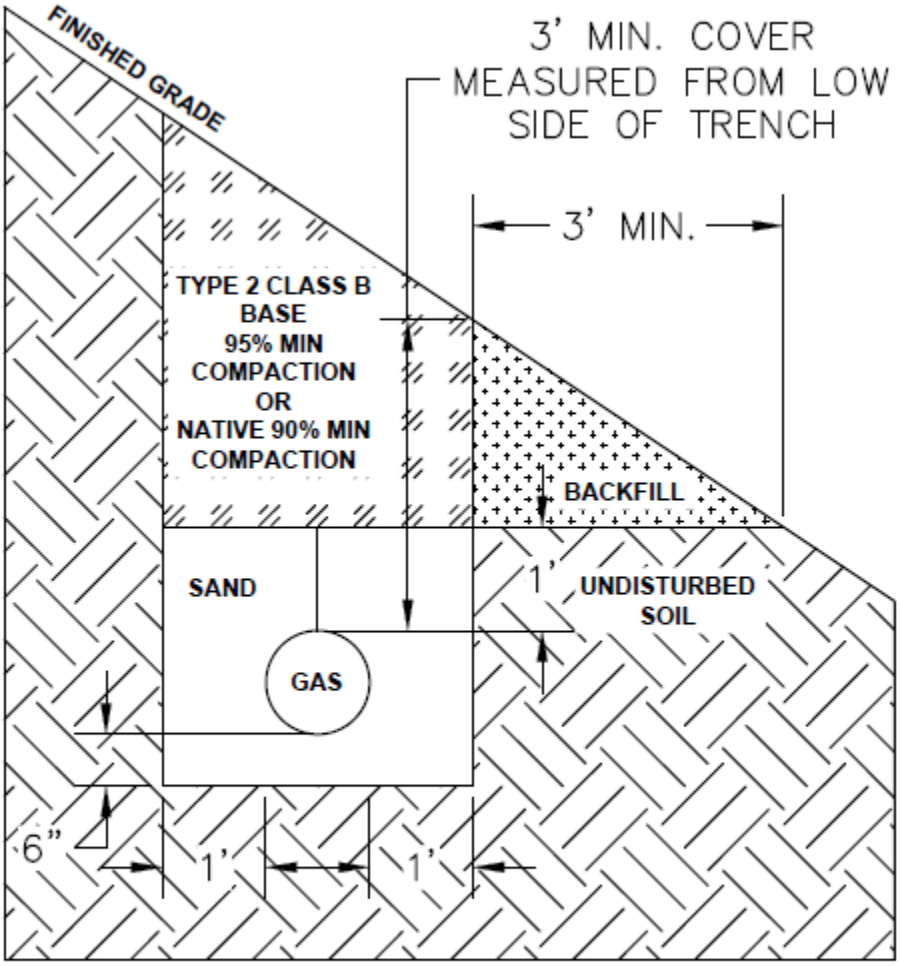


GAS ALONE MAIN
TRENCH DETAIL

NTS

Refer to 4.3.4. for further details on trench width and clearances

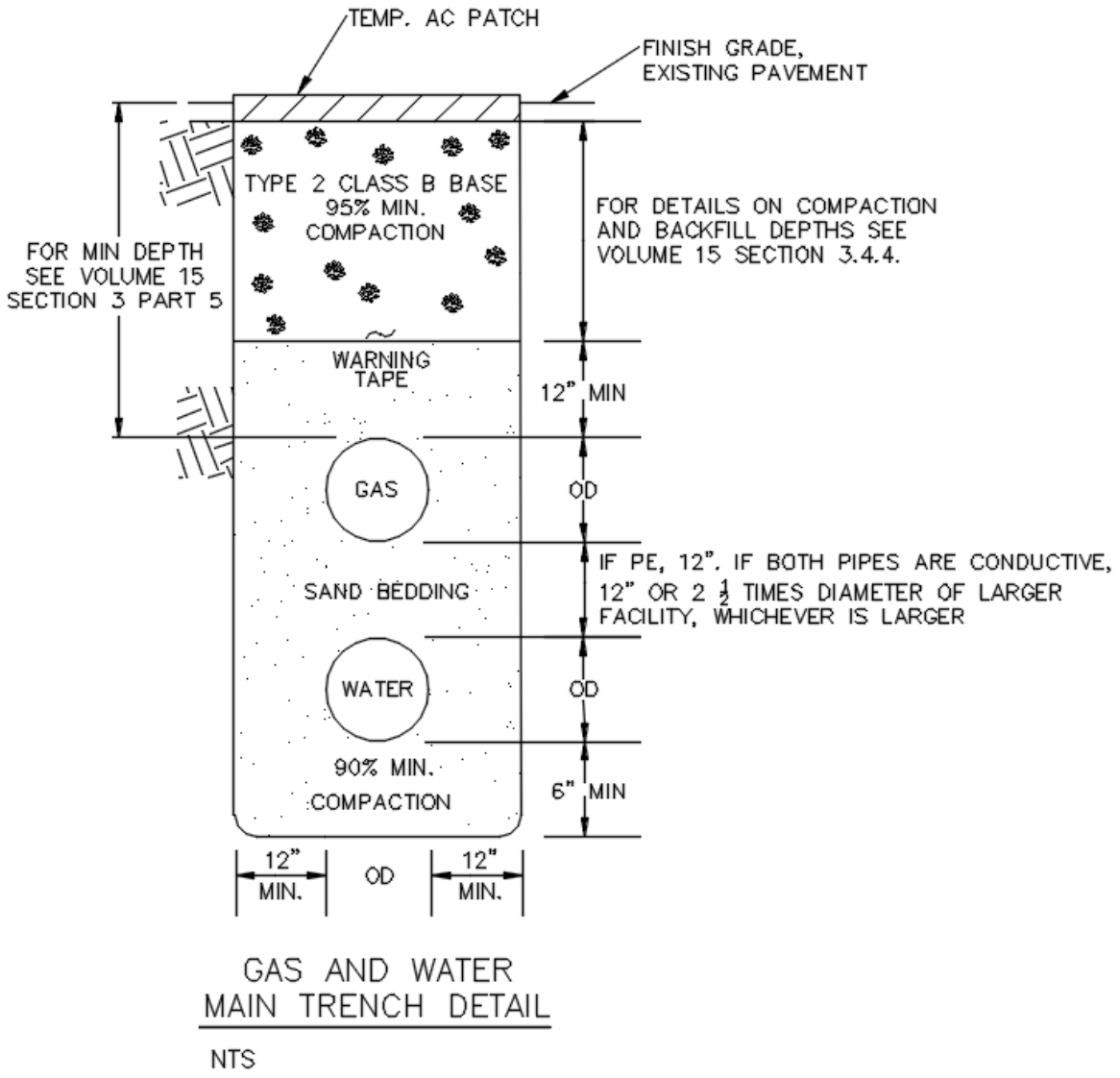
5.3. TYPICAL SLOPED GAS MAIN TRENCH DETAIL



NVE SLOPED TRENCH
GAS MAIN DETAIL
N.T.S.

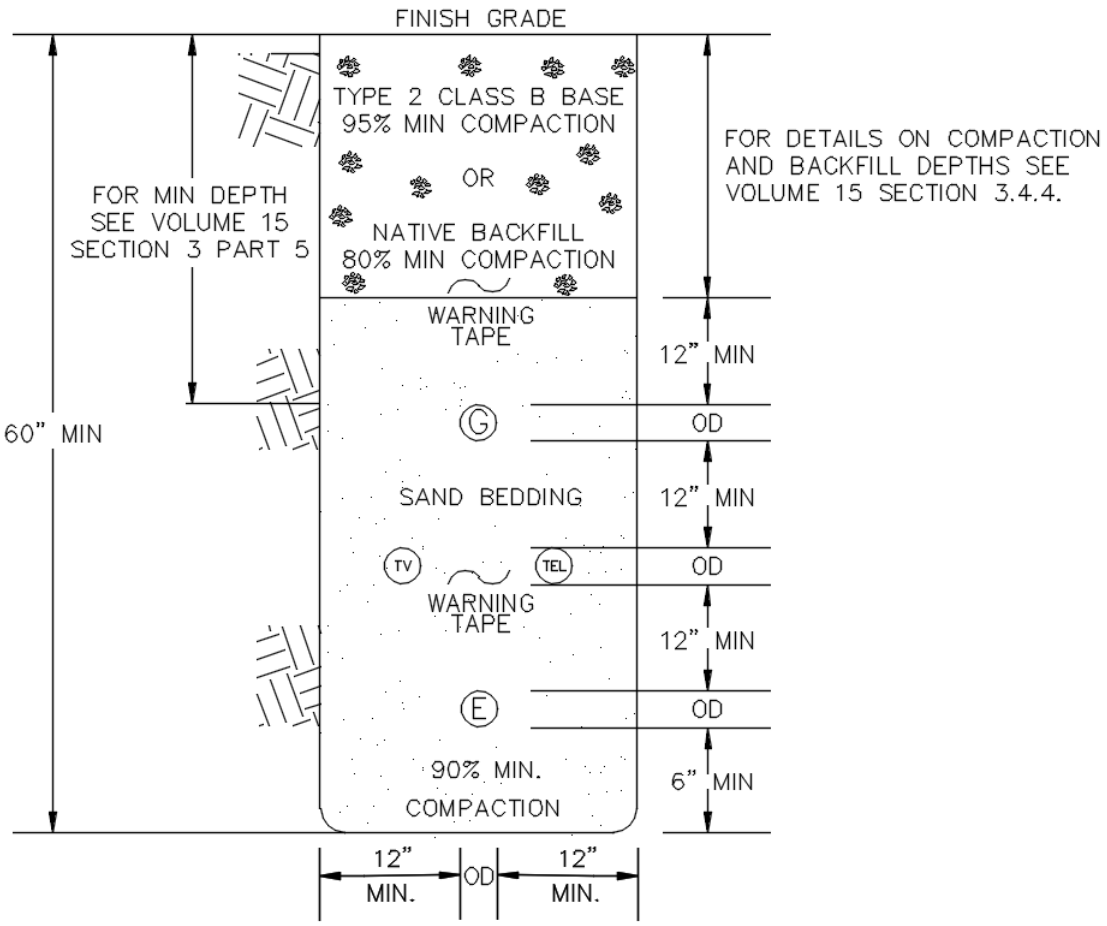
Refer to 4.3.4. for further details on trench width and clearances

5.4. TYPICAL GAS AND WATER JOINT MAIN TRENCH DETAIL



Refer to 4.3.4. for further details on trench width and clearances

5.5. TYPICAL SERVICE JOINT TRENCH DETAIL



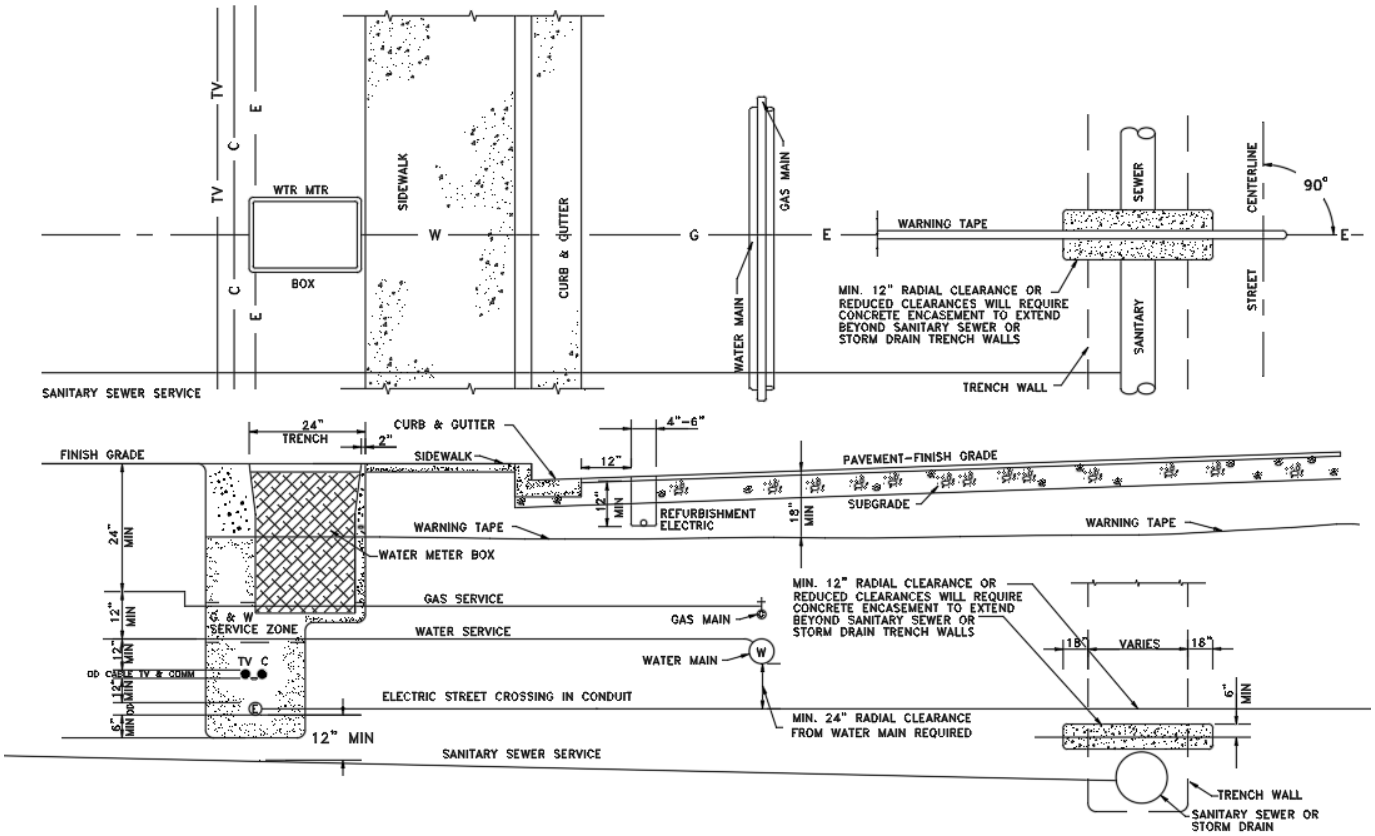
TYPICAL JOINT SERVICE
TRENCH DETAIL

NTS

Refer to 4.3.4. for further details on trench width and clearances

6. STREET CROSSING AND UTILITIES LOCATION DETAIL

- See parts 5.2, 5.3, 5.4, and 5.5 for typical trench details.
- See Section 3 part 3 for trench bedding and backfill specs.
- Electric to pass under gas mains with minimum 12” separation.
- Applicant to determine and stake finish grade.
- Comm/cable TV in conduit is allowed to cross over non-parallel gas services.
- Service stubs to cross main trench whenever possible.
- Conflict to facilities will be handled according to Section 3 part 5.
- Gas and water to adjust depth of service to coincide with their zone at main trench depth measured from finish grade.



7. EQUIPMENT LOCATION DETAILS