TTI: 0-6886

Texas A&M Transportation Institute

Guidelines for Installing, Operating, and Maintaining Temporary Saltwater Pipelines

Technical Report 0-6886-P1

Cooperative Research Program

TEXAS A&M TRANSPORTATION INSTITUTE
COLLEGE STATION, TEXAS

in cooperation with the
Federal Highway Administration and the
Texas Department of Transportation
http://tti.tamu.edu/documents/0-6886-P1.pdf

GUIDELINES FOR INSTALLING, OPERATING, AND MAINTAINING TEMPORARY SALTWATER PIPELINES

by

Cesar Quiroga, Ph.D., P.E.
Senior Research Engineer

William Holik, Ph.D.
Assistant Research Scientist

and

Jing Li, Ph.D., P.E.
Assistant Research Scientist

Product 0-6886-P1
Project 0-6886
Project Title: Engineering Guidelines for Installing Temporary Pipelines within the Right of Way

Performed in cooperation with the
Texas Department of Transportation
and the
Federal Highway Administration

Published: June 2019

TEXAS A&M TRANSPORTATION INSTITUTE
College Station, Texas 77843-3135

DISCLAIMER

This research was performed in cooperation with the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of FHWA or TxDOT. This report does not constitute a standard, specification, or regulation.

This guidebook is not intended for construction, bidding, or permit purposes. The engineer in charge of the project was Cesar Quiroga, P.E. (Texas Registration #84274).

The United States Government and the State of Texas do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

ACKNOWLEDGMENTS

This research was conducted in cooperation with TxDOT and FHWA. The researchers gratefully acknowledge the advice and assistance of the project advisors at TxDOT. The researchers met with numerous other individuals at TxDOT and other agencies to gather and/or complement data and information needed for the analysis. They gratefully acknowledge the valuable help and information received throughout the process. They are also grateful for the insights and information that Roger Bligh at the Texas A&M Transportation Institute provided concerning the crash worthiness and applicable traffic safety protocols for roadside devices.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

INTRODUCTION

TEMPORARY PIPELINES WITHIN THE RIGHT OF WAY

Water is used for many oil and gas activities, including but not limited to enhanced recovery applications, drilling, and completion of oil and gas wells. Water is also one of the byproducts of the operation of a well. Drilling a well can require anywhere from 65,000–600,000 gallons of water. Hydraulic fracturing involves pumping into the formation large volumes of water that includes components such as a friction reducer, surfactant and clay stabilizer, and sand. Hydraulic fracturing a horizontal well can require 2–6 million gallons of water (*1*, *2*, *3*). Moving these enormous amounts of water and other fluids for drilling and completing oil and gas wells requires considerable resources.

Generally, it is cheaper for the industry to move fluids by pipeline than by truck, hence the interest by the industry in using permanent and/or temporary pipelines to transport water in areas where oil and gas developments take place. Some of those pipelines are located within the right of way of public roads. The Texas Department of Transportation (TxDOT) has also noticed that in areas where temporary pipelines have been installed to carry water needed for drilling or fracking, the result has been less pavement degradation, hence the interest by the department in enabling the installation of temporary pipelines within the state right of way.

TxDOT uses two types of lease agreements for the installation of saltwater pipelines on the right of way. Short-term leases (up to 90 days) are used for aboveground temporary saltwater pipelines and are mainly intended to carry non-produced water. These leases can be extended once for another 90 days. Long-term leases (for periods less than two years, between two and five years, or greater than five years) are used for underground saltwater pipelines and are mainly intended to carry produced water.

PURPOSE OF THE GUIDEBOOK

This guidebook describes recommended practices for the accommodation, installation, operation, and maintenance of temporary pipelines within the right of way. The recommendations are based on the findings and lessons learned from TxDOT Research Project 0-6886 and focus primarily on aboveground temporary pipelines (*4*). The scope of the research did not include underground pipelines.

The guidebook is intended for three main user groups, as follows:

- TxDOT division and district personnel responsible for leasing the right of way.
- Oil and gas operators and their subcontractors.
- TxDOT district personnel responsible for inspecting and managing temporary pipelines in the field.

The topics covered in the guidebook follow the life cycle of a temporary pipeline and range from applying for a lease, water characteristics, constructing pipelines, pipeline crossings, maintaining the right of way, maintaining temporary pipelines, and removing temporary pipelines. The

guidelines focus on critical information for TxDOT and operators but not on prescriptive mandates about how things are to be done.

NEED FOR THE GUIDEBOOK

The 0-6886 research included a review of standards, specifications, and practices in Texas and others states; data collection in the field to extract information about typical installation trends; a hydraulic analysis to estimate the impact of temporary pipelines in the hydraulic capacity of culverts; a review of the characteristics and impact of saltwater on the roadside; and stakeholder meetings to discuss trends and lessons learned.

Although the use of temporary pipelines has brought considerable benefits because fewer trucks are needed to transport water for energy development sites, the research uncovered many issues related to the installation and operation of temporary pipelines that warrant the implementation of guidelines to clarify roles and responsibilities, improve pipeline installation and operation practices, and minimize the level of risk and exposure to TxDOT and the citizens of the state. Examples of issues include but are not limited to the following:

- Temporary pipelines that occupy the right of way without proper authorization.
- Temporary pipelines that use highway culverts incorrectly or driveway culverts illegally.
- Water being transported with a much higher salt content than what TxDOT envisioned when temporary pipelines were first permitted on the state right of way.
- Temporary pipelines that are placed all over the roadside, including the bottom of ditches and near the edge of pavement, therefore affecting the clear zone.
- Perceptions by temporary pipeline operators that they follow effective practices, not realizing that their pipelines interfere with TxDOT roadside maintenance activities.

The following examples highlight some of the issues observed in the field. These examples represent only a small sample of all the issues documented in the research (*4*). Figure 1 shows an example of metal stakes used to secure an aboveground temporary pipeline. Temporary pipelines tend to move because of pressure changes when water pumps are started and stopped. They also tend to drift downward if they are not secured. Initially, operators used small wooden stakes to anchor temporary pipelines, but these wooden stakes break easily. Metal posts are more durable and therefore more effective for anchoring temporary pipelines than wooden stakes. However, metal posts can become safety hazards if they are not installed correctly. More information about clear zones is included in the TxDOT *Roadway Design Manual* (*5*). The Methods For Anchoring Temporary Pipelines section in this guidebook covers guidelines related to crash worthiness of devices used to anchor temporary pipelines.

Figure 1. Metal Fence Posts Used to Anchor a Temporary Pipeline in Place.

Figure 2 illustrates another safety issue because of the proximity of a temporary pipeline to the edge of pavement as well as illustrates the practical challenge of how to deal with existing vegetation. In this case, the pipeline operator avoided the existing vegetation but ended up placing the temporary pipeline within the clear zone or at the bottom of the ditch. To install the temporary pipeline against the right-of-way line, the operator would have had to clear and remove a significant amount of vegetation. The TxDOT *Vegetation Management Manual* provides guidance on how to manage existing vegetation within the right of way (*6*).

Figure 2. Temporary Pipeline Installation around Vegetation.

Figure 3 shows a temporary pipeline running through a small driveway culvert. This type of installation is not allowed. However, it happens all too frequently according to TxDOT maintenance inspectors.

Figure 3. Temporary Pipeline Installed in a Small Diameter Driveway Culvert.

Figure 4 shows a temporary pipeline that was left in place within a highway culvert. Some pipeline operators have difficulty removing temporary pipelines from a culvert and simply decide to cut and abandon the pipeline section in the culvert. In other cases, TxDOT maintenance inspectors have found culvert safety end treatments that were bent or broken during the installation or removal of a temporary pipeline.

Figure 4. Temporary Pipeline Cut and Abandoned in a Highway Culvert.

Figure 5 shows another example of temporary pipelines that were installed at the bottom of the ditch as well as rutting and other damage to the roadside caused by vehicles or other equipment used to install the temporary pipelines.

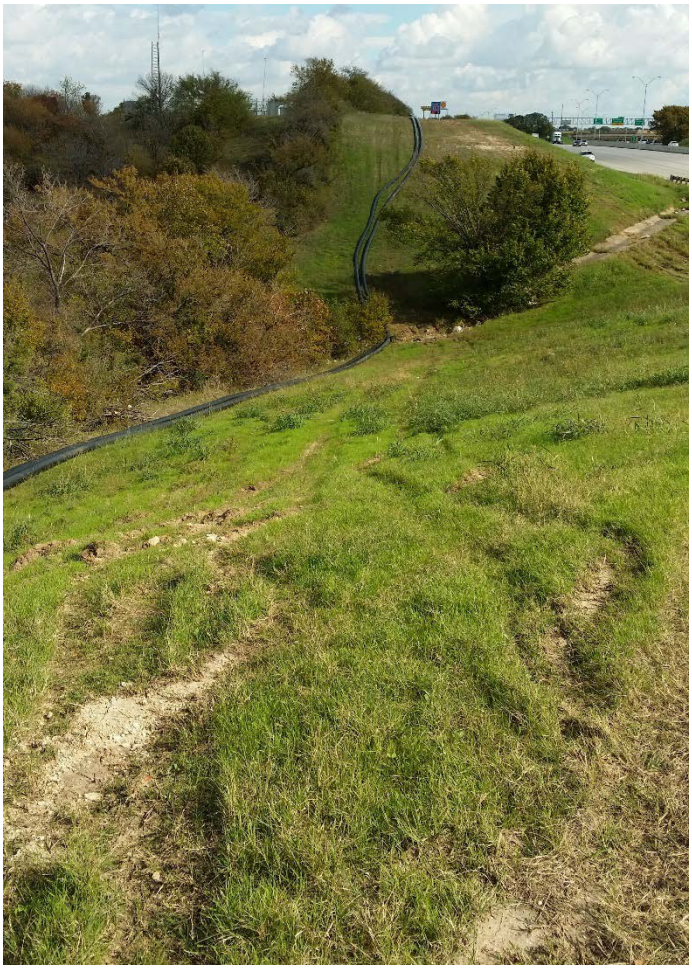


Figure 5. Temporary Pipelines Installed at the Bottom of the Ditch and Rutting Caused by Vehicles or Equipment.

HOW TO USE THE GUIDEBOOK

The guidebook is organized in sections that correspond to major activities associated with the installation and operation of temporary pipelines, as follows:

- Temporary pipeline leases.
- Temporary pipeline specifications and water characteristics.
- Temporary pipeline construction requirements.
- Temporary pipeline operation and maintenance.
- Temporary pipeline lease completion.

Throughout the document, the term operator refers to oil and gas energy developers and all their related subcontractors. The term pipeline operator is more specific and refers to the entity that enters into a lease agreement with TxDOT to install and operate a temporary pipeline.

This guidebook includes references to several design manuals, guidebooks, laws, and regulations as they pertain to temporary pipeline practices. The list of references is provided in the References section. In particular, readers should be familiar with the following manuals, standards, forms, and regulations:

- TxDOT *Roadway Design Manual* (*5*).
- TxDOT *Roadside Vegetation Management Manual* (*6*).
- *Texas Manual on Uniform Traffic Control Devices* (TMUTCD) (*7*).
- Traffic Control Plan Standards (*8*).
- Compliant Work Zone Traffic Control Device List (*9*).
- TxDOT *Project Development Process Manual* (*10*).
- American Association of State Highway and Transportation Officials (AASHTO) *Manual for Assessing Safety Hardware* (MASH) (*11*).
- TxDOT *Use of Right of Way by Others Manual* (*12*).
- TxDOT *Occupational Safety Manual* (*13*).
- TxDOT Lease Application for Saltwater Pipeline Facility to be Located on State Right of Way (Form ROW-SW-APP) (*14*).
- TxDOT Temporary Saltwater Pipeline Lease (Form ROW-SW-LeaseTemp) (*15*).
- Texas Administrative Code, Title 43, Part 1, Chapter 21 (*16*).
- Texas Natural Resources Code (*17*).

BASIC TERMINOLOGY

The following are definitions of terms used throughout this guidebook. As needed, additional commentary provides clarification about potential sources of sources of confusion in terminology.

- **Salinity.** Salinity is the total amount of salts (inorganic matters) dissolved in water (*18*). Total dissolved solids (TDS) is a measure of both dissolved inorganic and organic matters. TDS is widely used to express salinity and is therefore used throughout this guidebook.

- **Produced water**. Produced water is water that is extracted from the ground along with liquid and gas hydrocarbons. Produced water includes flowback water (i.e., water that is extracted from a well being developed or completed) and recycled water (i.e., produced water that has been treated to remove certain components).

- **Non-produced water**. Non-produced water is water that is not produced as a byproduct of drilling, completing, or operating an oil or gas well.

- **Source water**. Source water is groundwater or surface water that has not been used previously for another purpose. Source water is a subset of non-produced water (i.e., all source water is non-produced water, but not all non-produced water is source water).

- **Fresh water**. Section 27.0516 of the Texas Water Code defines fresh water as "surface water or groundwater, without regard to whether the water has been physically, chemically, or biologically altered, that (a) contains a TDS concentration of not more than 1,000 milligrams per liter; and (b) is otherwise suitable as a source of drinking water supply" (*19*).

- **Brackish water**. Brackish water is water that contains more than 1,000 and up to 10,000 mg/L of TDS (*20*). Some stakeholders consider water that contains up to 35,000 mg/L of TDS to be brackish, but this definition does not appear to be very common.

- **Saline water**. Saline water is water that contains more than 10,000 and up to 35,000 mg/L of TDS (*21*).

- **Brine**. Brine is water than contains more than 35,000 and up to 300,000 mg/L of TDS (*22*). Water with greater than 300,000 mg/L of TDS is considered saturated brine with undissolved salt.

- **Saltwater**. According to Section 91.901(1) of the Texas Natural Resources Code, saltwater is "water that contains salt and other substances and is intended to be used in drilling or operating a well used in the exploration for or production of oil or gas, including an injection well used for enhanced recovery operations, or is produced during drilling or operating an oil, gas, or other type of well. The term includes a pipeline facility that conducts flowback and produced water from an oil or gas well on which a hydraulic fracturing treatment has been performed to an oil and gas waste disposal well for disposal" (*17*).

- **Saltwater pipeline**. A saltwater pipeline is a pipeline that carries saltwater.

- **Temporary saltwater pipeline**. A temporary saltwater pipeline is an aboveground saltwater pipeline that is not in place for more than 180 days and satisfies the requirements of 43 TAC 21.57 (*16*).

FOR ADDITIONAL INFORMATION

For additional information about the temporary pipeline lease program, contact the Right of Way Division at TxDOT at (512) 416-2901.

TEMPORARY PIPELINE LEASES

INTRODUCTION

TxDOT uses two types of lease agreements for the installation of saltwater pipelines on the right of way. Short-term leases (up to 90 days) are used for aboveground temporary saltwater pipelines, mainly intended to carry non-produced water. These leases can be extended once for another 90 days. Long-term leases (for periods less than two years, between two and five years, or greater than five years) are used for underground saltwater pipelines, mainly to carry produced water.

OBTAINING A TEMPORARY PIPELINE LEASE

Steps to obtain a temporary pipeline lease are shown in Figure 6 and described below.

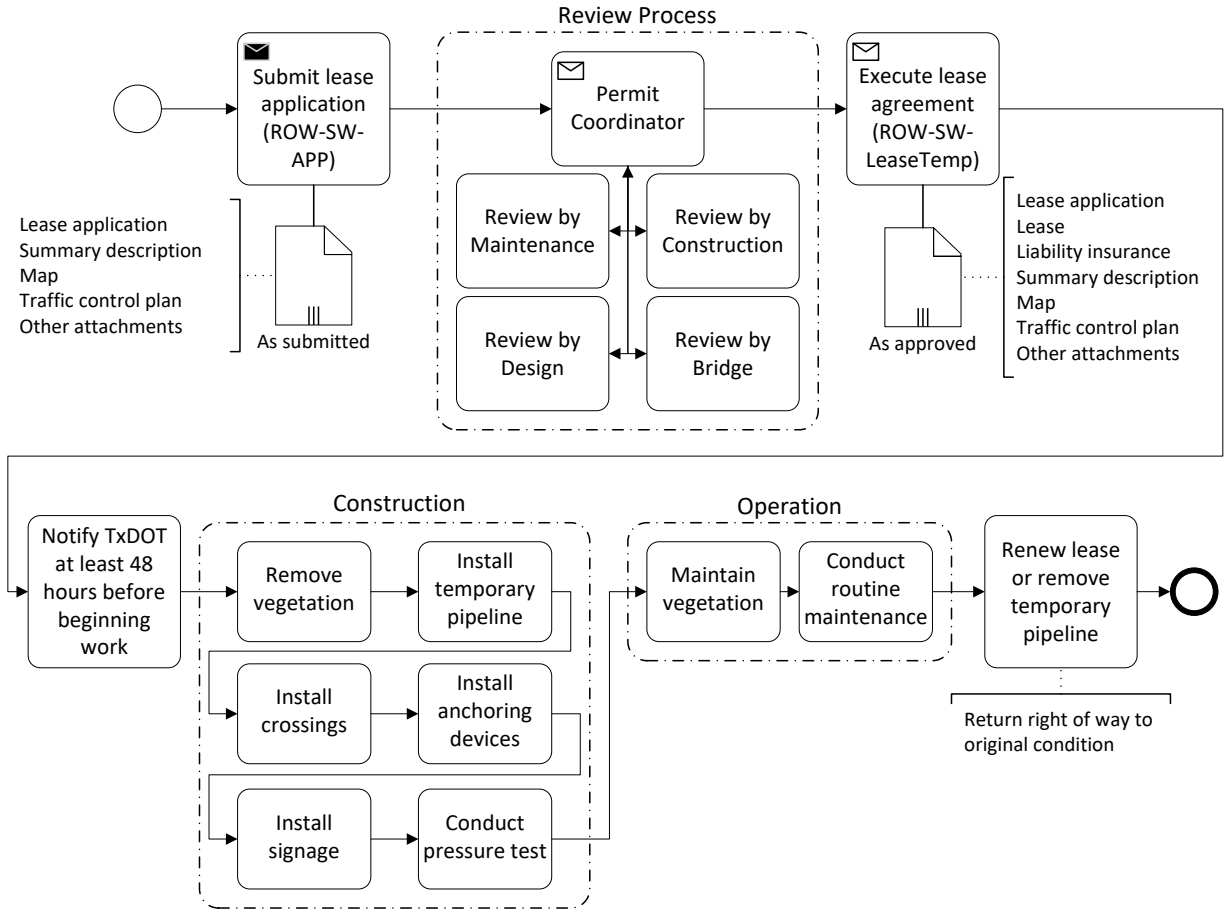


Figure 6. Temporary Pipeline Lease Process.

- **Submit lease application using Form ROW-SW-APP (*14*)**. The applicant selects the type of proposed installation and lease period. For aboveground temporary pipelines, the maximum lease period is 90 days, which can be extended once for another 90 days. The application form includes basic information, including, but not limited to, contact

information of the applicant, proposed location of the temporary pipeline, and type of pipeline. When completed, the applicant submits the application package to the TxDOT district office that has jurisdiction over the state highway where the proposed temporary pipeline will be located.

Hint: Before submitting the lease application form to the district office, contact the area office or maintenance section where the proposed temporary pipeline will be located. Advance coordination with those field offices enables the applicant to learn about potential restrictions (e.g., active highway construction or maintenance activities) that might have a negative impact on the applicant's capability to install and operate the temporary pipeline as originally intended.

- **Submit traffic control plan (TCP) and notify TxDOT**. Prior to beginning any work in the field, the pipeline operator must submit a TCP for review and approval. TxDOT has a wide range of TCPs for different types of work within the right of way, and operators are strongly encouraged to use one of the standard TCPs (*8*). Operators should include the proposed TCP with their lease application to ensure that district officials have an opportunity to review and approve it before TxDOT executes the lease agreement.

- **Review lease application (TxDOT)**. TxDOT district officials review the technical feasibility of the proposed temporary pipeline. This activity could involve several rounds of field visits and meetings with the applicant.

  Hint: Pipeline operators should allow ample time for TxDOT to review the lease application. The review process is comprehensive and involves determining not only the technical feasibility to accommodate the temporary pipeline within the right of way but also any impacts of the proposed pipeline on TxDOT's ability to operate and maintain the state highway system effectively. Drilling and developing a well involves a great deal of planning by an energy developer as well as coordination with all of its subcontractors. This process usually takes place over several months, which means that energy developers should normally be able to provide pipeline operators with ample advance time so that these operators can submit their own lease applications to TxDOT in a timely fashion.

- **Execute lease agreement using Form ROW-SW-LeaseTemp (*15*)**. If the district office confirms that the proposed temporary pipeline installation is feasible, a representative from TxDOT contacts the applicant to execute the lease agreement. The lease agreement includes several provisions pertaining to the accommodation of temporary pipelines. The lessee should also include a map of the proposed temporary pipeline location, applicable permit numbers and coordinates for water origins and destinations, and a certificate of liability insurance. The lessee must also pay the applicable rent.

- **Notify TxDOT**. The pipeline operator must notify the appropriate TxDOT area office or maintenance section at least 48 hours before beginning the field work. A copy of the lease agreement must be kept at the jobsite while workers are present.

A checklist is provided in the appendix for use by pipeline operators as a reference when preparing the documentation for submitting a lease application and for executing a lease agreement with TxDOT for installing and operating an aboveground temporary pipeline within the right of way.

TEMPORARY PIPELINE SPECIFICATIONS

WATER CHARACTERISTICS

Water that can be transported in aboveground temporary pipelines could fall under one of the following categories:

- **Fresh water (i.e., TDS up to 1,000 mg/L)**. This is the preferred type of water to be transported by aboveground temporary pipelines.

- **Slightly saline water (i.e., TDS greater than 1,000 and up to 3,000 mg/L)**. This type of water is acceptable to be transported by aboveground temporary pipelines.

- **Moderately saline water (i.e., TDS greater than 3,000 and up to 10,000 mg/L)**. This type of water is not recommended to be transported by temporary pipelines, but exceptions could be made under certain circumstances at the discretion of the district engineer.

Very saline water (i.e., TDS greater than 10,000 mg/L) is not allowed to be transported in aboveground temporary pipelines.

Pipeline operators must disclose the TDS value of the water they intend to transport in their lease applications. The applicant must use an accepted industry standard such as the gravimetric analysis technique to measure TDS. TxDOT reserves the right to request a copy of the detailed results of the TDS analysis.

Hint: Because the TDS of the water might change over time, it is acceptable for pipeline operators to provide a range, as long as the range is relatively narrow (e.g., no more than 500 mg/L or 10 percent between the minimum and the maximum values).

TEMPORARY PIPELINE SIZE AND MATERIAL

Temporary saltwater pipelines must not exceed 12 inches in diameter. Polyethylene temporary pipelines are usually 3 or 4 inches in diameter and are used during the drilling phase of well development. Lay-flat temporary pipelines are 8 or 10 inches in diameter and are used during hydraulic fracturing or well completion activities.

Approved Materials

Approved materials for temporary pipelines include lay-flat and high density polyethylene (HDPE) pipelines. Approved pipeline materials are subject to the pressure ratings in the following section. As materials and practices evolve, the district engineer or a designee may approve other materials on a case-by-case basis or for widespread approval. Figure 7 shows examples of polyethylene and lay-flat temporary pipelines.

(a) Polyethylene pipeline

(b) Lay-flat pipeline

Figure 7. Polyethylene and Lay-Flat Temporary Pipelines.

Unapproved Materials

Metal pipelines were initially used by operators for temporary pipelines. However, these materials leak frequently and are harder to install and remove. They are also a safety risk for motorists. Metal materials such as aluminum and steel must not be used for aboveground temporary pipelines. Figure 8 shows an example of aluminum temporary pipelines.

Figure 8. Aluminum Temporary Pipelines.

PRESSURE RATINGS AND FLOW RATES

Burst and operating pressures are factors that govern temporary pipeline design and operation. Burst pressure refers to the maximum localized pressure that a temporary pipeline can withstand before failing. Burst pressure ratings for common temporary pipeline materials are in the range of 220–600 psi for polyethylene pipelines and 220–1,200 for lay-flat pipelines. Based on these burst pressure ratings, burst pressure is highly unlikely to be a limiting factor for temporary pipelines in the state right of way.

Operating pressure refers to the maximum sustained pressure during ordinary use that the pipeline material is rated to withstand. As requested by the district, operators must submit a copy of the specifications detailing operating and burst pressure ratings of the temporary pipeline being proposed. At this point, the Texas Administrative Code requires operating pressures of temporary pipelines not to exceed 60 psi at any point along the pipeline (*23*).

Operators should disclose the operating and burst pressures (in psi) as well as the nominal (or design) and maximum flow rate (in gallons per minute) of the proposed temporary pipeline installation with the lease application.

TEMPORARY PIPELINE CONSTRUCTION REQUIREMENTS

MOBILIZATION REQUIREMENTS

Notification prior to Beginning Work

The TxDOT area office and/or maintenance section with jurisdiction over the temporary pipeline installation location must be notified 48 hours prior to beginning any field work. Contact information for area and maintenance offices can be found at: http://www.txdot.gov/inside-txdot/district.html.

Equipment

Equipment to install temporary pipelines should be kept off roadway lanes and shoulders. Pipeline operators should follow the traffic control guidelines in the Field Safety Procedures section. The use of equipment should not damage vegetation, soil, backslopes, foreslopes, highway structures, or roadside drainage.

Site conditions should be evaluated prior to using equipment in the field. Rutting can be caused by equipment. It is the responsibility of the pipeline operator to return the right of way to its original condition after the work is complete. This includes repairing any damage to the soil, vegetation, and infrastructure in the right of way. More information about repairing damage caused while working in the right of way can be found in the Return Right Of Way To Original Condition section.

Pipeline operators should verify that there is adequate horizontal and vertical clearance in the right of way for the type of equipment that they will use. Equipment should not interfere with overhead utilities or other infrastructure in the right of way. Equipment and materials should not overhang the pavement. Narrow rights of way or those with significant roadside vegetation may not have adequate clearance for equipment or materials. For any excavation that exceeds 16 inches in depth, which includes driving stakes into the ground to anchor temporary pipelines, the pipeline operator must notify a One Call notification center at least two working days prior to starting work.

Staging

Equipment and materials must not be staged or stored in the right of way. Equipment and materials should be kept off site and brought in to the right of way as needed.

FIELD SAFETY PROCEDURES

Traffic Control Plan

Appropriate traffic control is required whenever operators are working in the right of way. The TMUTCD has information pertaining to which signs are required and their spacing in regard to roadways and other signs (*7*). Pipeline operators should submit a TCP to the local TxDOT area or maintenance office and receive approval prior to beginning any work. Details about TCPs can be found in the TxDOT *Project Development Process Manual* (*10*). TxDOT also provides

standard TCPs that may be applied to a specific installation location being proposed (*8*). The TCPs are provided in portable document format (.pdf) and Microstation (.dgn) file types.

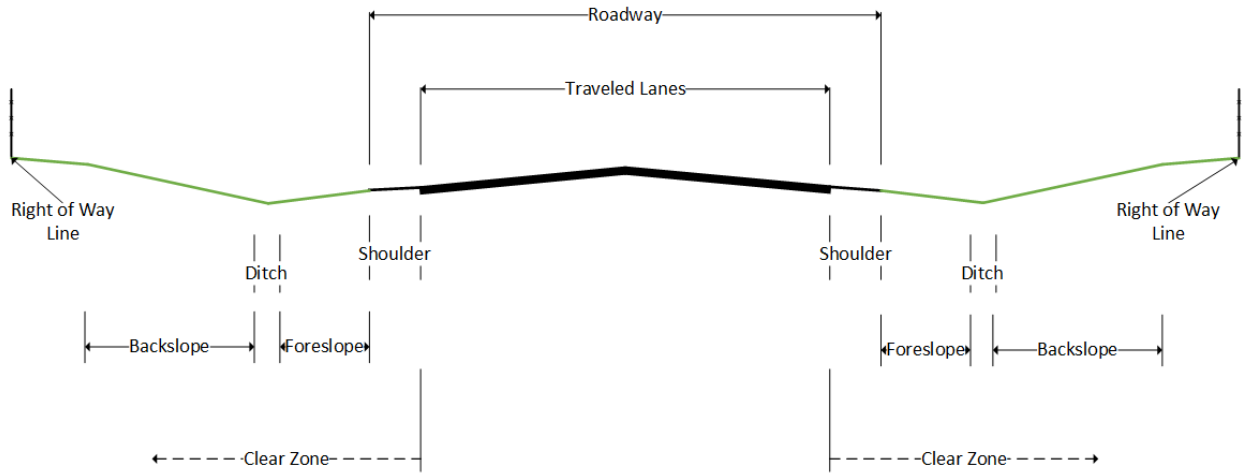
Personal Protective Equipment

Operators are required to wear high visibility vests, steel-toe boots, hard hats, and safety glasses at all times while in the right of way. Depending on the work being performed, pipeline operators may be required to wear protective gloves (*13*). The Occupational Safety and Health Administration has recommendations for personal protective equipment that should be worn for construction work (*24*).

INSTALLATION LOCATION

Whenever possible, temporary pipelines should be installed within 3 feet of the right-of-way line. When vegetation prevents the installation of temporary pipelines within 3 feet of the right-of-way line, refer to the Vegetation Management section and contact TxDOT about where temporary pipelines should be installed. Depending on clear zone requirements and distance from the edge of pavement to the vegetation, the temporary pipeline may be placed at the edge of the vegetation, or it may need to be located elsewhere.

Temporary pipelines should be installed on backslopes as close to the right-of-way line as possible. Under no circumstances should they be installed on foreslopes, at the bottom of a ditch, or in a median. Figure 9 depicts a generic road cross section with relevant roadside geometric features, including foreslope, backslope, ditch, and clear zone.



Note: Not to Scale.

Figure 9. Generic Road Cross Section.

Temporary pipelines should be installed in a manner that maintains a uniform alignment (i.e., temporary pipelines should not snake in the right of way or roll down slopes). Temporary pipelines should not deviate laterally from the centerline shown in the spatial data file that was submitted when the lease agreement was executed by more than 6 inches. Information for anchoring temporary pipelines to maintain this alignment can be found in the Methods For

Anchoring Temporary Pipelines section. The use of anchors and maintaining a uniform, controlled alignment facilitates roadside maintenance activities and the accommodation of additional temporary pipelines.

The right of way should be returned to its original condition after installation. No damage should be done to vegetation, soil, drainage, foreslopes, or backslopes. The Return Right Of Way To Original Condition section provides additional information about repairing the right of way.

METHODS FOR ANCHORING TEMPORARY PIPELINES

Unless temporary pipelines are anchored, they tend to drift either because of changes in the operating pressure inside the pipeline or because of where they are placed on the ground. Pipeline operators are responsible for ensuring that their pipelines do not shift laterally by more than 6 inches from the alignment that was approved when the lease agreement was executed. This requirement means that, under normal circumstances, temporary pipelines must be anchored. Any exceptions to this requirement are at the discretion of the district engineer. However, such an exception does not relieve the pipeline operator from the requirement to ensure that the temporary pipeline does not drift by more than 6 inches.

When anchoring temporary pipelines, pipeline operators must be aware of the following:

- The method used to secure temporary pipelines should not interfere with any underground utilities and must comply with all existing damage prevention laws and regulations in Texas (*25*).

- The method used to secure temporary pipelines must be crashworthy in accordance with the requirements included in Tests 70, 71, and 72 in the AASHTO MASH (*11*).

- The method used to secure temporary pipelines should not damage the right of way or right-of-way fence.

- The temporary pipeline should not deviate from its centerline by more than 6 inches.

The pipeline operator must use devices to keep temporary pipelines from deviating from their centerline or moving to the bottom of the slope. The operator may use devices such as stakes, pipes, or other acceptable devices, provided the devices meet the following requirements:

- The device must not exceed 4 feet in length and 4.5 inches in diameter or width.

- The height of the device above ground must not exceed 3 feet.

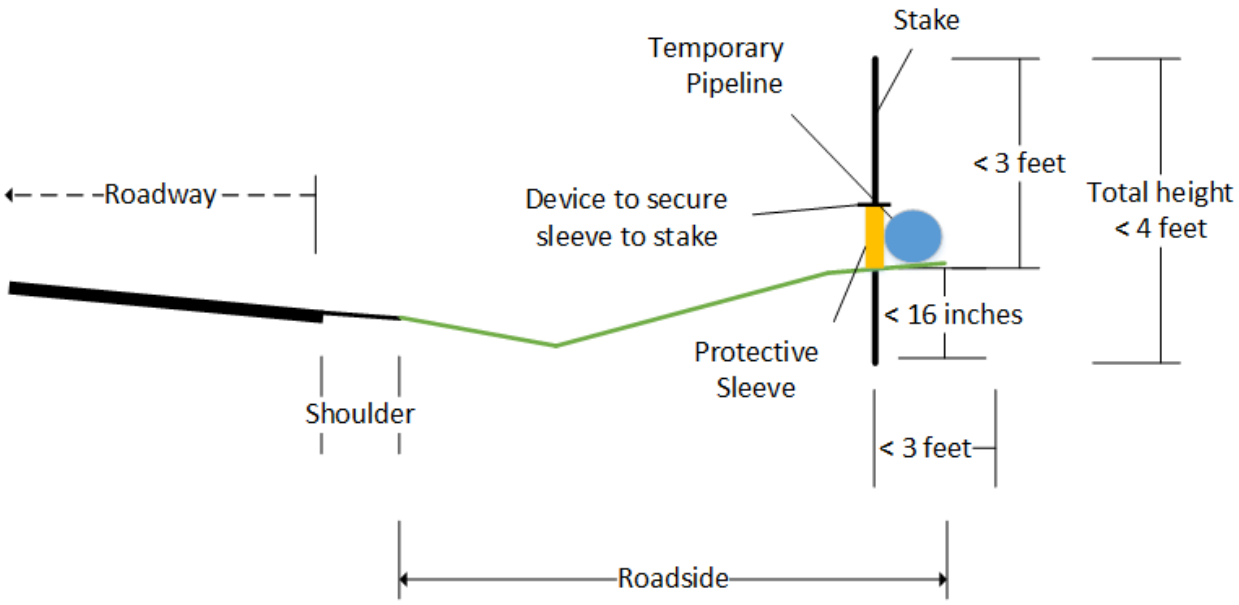
- The depth of the device below ground must not exceed 16 inches or the maximum allowed depth per One Call requirements in Texas (*26*).

- The district engineer may request proof of compliance with AASHTO MASH if the device is a stake or pipe. For any other device, the operator must submit proof of compliance with AASHTO MASH as part of the lease application process.

- When using a stake, the operator must use a protective sleeve or similar appurtenance to protect the temporary pipeline, as shown in Figure 10. The operator must secure the protective sleeve to the stake to prevent vertical movement of the sleeve, which might cause the temporary pipeline to rub against the stake.

Figure 10. Protective Sleeve between Stake and Temporary Pipeline.

Figure 11 shows relevant features to consider when using a method to keep temporary pipelines in place.



Note: Not to Scale.

Figure 11. Installation Criteria to Anchor Temporary Pipeline.

SIGNAGE AND MARKINGS

All temporary pipelines must have identifiable, durable, and weatherproof markers. The markers should be placed where temporary pipelines cross the right-of-way line, and stencils or small signs attached to temporary pipelines should be placed every one mile in between. All markers must include the word “warning,” “caution,” or “danger” and must indicate the name, address, and email of the pipeline operator and a telephone number where the pipeline operator can be reached at all times. Figure 12 shows sample information that should be displayed. Signs should be constructed in accordance with TxDOT’s Compliant Work Zone Traffic Control Device List for short-term or short-duration work zone sign supports (*9*). Requirements vary depending on the material of the sign, but standard design requirements are available for plywood, roll-up, and fiberglass-reinforced plastic sign panels.

Temporary Pipeline Operator	
Caution Non-Potable Temporary Water Line	
John Smith	
123 Main St.	555-555-5555
City, TX 12345	j.smith@company.com

Figure 12. Temporary Pipeline Marker Information.

CROSSING PROPERTY ENTRANCES

Temporary pipelines frequently need to cross property entrances or access driveways. Property entrances must not to be blocked or open cut without specific authorization from the property owner. Culverts and drainage structures underneath access driveways should not be used to cross access driveways unless they meet the requirements in the Crossing Roadways Through Culverts section. Temporary driveway crossings (ramps and manifolds) should be used to cross driveways. If a landowner requests that a temporary pipeline be trenched or buried below his or her driveway or to cross under the cattle guard, written authorization by the landowner is to be submitted with the temporary pipeline lease application.

Ramps and manifolds should be of equivalent or greater width than the driving surface and should not exceed 4 inches in height. These structures must be of sufficient load-carrying capacity to support vehicles and equipment that may use access driveways. In some instances, landowners may request ramps to be built out of caliche or some other material to reduce the grade for the transition over the temporary pipeline crossing structure. Figure 13 shows examples of ramps and manifolds used for temporary pipeline driveway crossings.

(a) Crossing ramp

(b) Manifold

Figure 13. Temporary Pipeline Driveway Crossing Ramp and Manifold.

Because temporary pipeline driveway crossings should not exceed 4 inches in height, ramps are typically used with temporary pipelines 4 inches in diameter or smaller and manifolds are used with pipelines larger than 4 inches in diameter. A disadvantage of the manifold shown in Figure 13 is that the box ends are taller than 4 inches, which increases the safety risk if an errant vehicle strikes the appurtenance. Manifold ends should be flush with the rest of the manifold to reduce the aboveground height of manifolds to 4 inches or less. The sketch in Figure 14 shows a potential solution, but other solutions may be possible to accomplish the same goal.

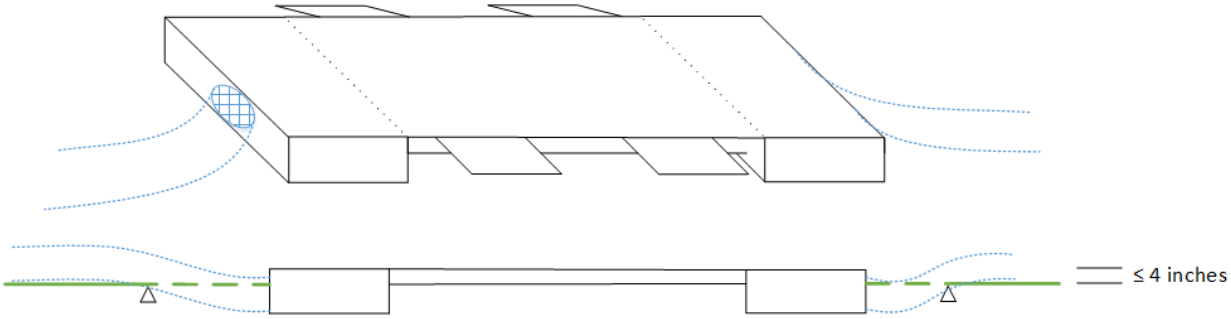


Figure 14. Temporary Driveway Manifold with Reduced Height.

CROSSING STATE ROADS

If it is necessary to cross under a state road, two possibilities are available: (a) bore under the road to create a crossing location or (b) cross through an existing culvert. Approval for which method to use is at the discretion of the district engineer.

Directional Boring

Directional boring has many advantages because the temporary pipeline does not affect the hydraulic capacity of existing culvert structures. At the same time, directional boring requires adequate planning to minimize right-of-way impacts. Advance coordination with the corresponding TxDOT area office is critical to select the appropriate location and review of the construction plan. The pipeline operator must also comply with One Call requirements prior to digging to avoid any existing utilities. The Texas Administrative Code includes requirements for roadway crossings, including minimum depth of cover and encasement (*27*). Borings must maintain a 30-foot clearance from all highways except for roads with traffic volumes of up to 750 vehicles per day, which require a 16-foot clearance.

Crossing Roadways through Culverts

Using a culvert to cross under a road is convenient for the pipeline operator. However, the primary purpose of a culvert is to convey runoff water away from the road, which is a critical transportation function. Installing a temporary pipeline inside a culvert reduces the hydraulic capacity of the culvert. TxDOT designs culverts for a specific return period (e.g., 25 years in the case of arterials and 10 years in the case of minor arterials and collectors) and checks the potential flooding for a 100-year rainfall event. A reduction in hydraulic capacity effectively reduces the return period. For example, for a design return period of 25 years, a 15 percent

reduction in capacity would reduce the return period to 10 years, a 28-percent reduction in capacity would reduce the return period to 5 years, and a 35 percent reduction in capacity would reduce the return period to 2 years. Similarly, for a design return period of 10 years, a 15 percent reduction in capacity would reduce the return period to 5 years, and a 35 percent reduction in capacity would reduce the return period to 2 years.

In order to minimize this impact, TxDOT does not allow more than two pipelines inside a culvert at any given time. For smaller sized culverts, only one (or no) pipeline is allowed. Table 1 shows the maximum number of various temporary pipelines allowed in box culverts. Table 2 shows the maximum number of various temporary pipelines allowed in pipe culverts.

Table 1. Maximum Temporary Pipeline Diameter for Box Culverts.

Box Culvert Span × Rise (feet)	Temporary Pipeline Diameter (inches)					
	3	4	6	8	10	12
	Maximum Number of Temporary Pipelines in Culvert					
2 × 2	2	2	2	1	0	0
2 × 3	2	2	2	1	1	0
3 × 2	2	2	2	2	1	0
3 × 3	2	2	2	2	1	0
3 × 4	2	2	2	2	2	1
4 × 2	2	2	2	2	2	1
4 × 3	2	2	2	2	2	1
≥ 4 × 4	2	2	2	2	2	2

Table 2. Maximum Temporary Pipeline Diameter for Pipe Culverts.

Pipe Culvert Diameter (inches)	Temporary Pipeline Diameter (inches)					
	3	4	6	8	10	12
	Maximum Number of Temporary Pipelines in Culvert					
24	2	2	1	0	0	0
30	2	2	2	1	0	0
36	2	2	2	2	1	0
42	2	2	2	2	2	1
≥ 48	2	2	2	2	2	2

Sedimentation buildup can reduce the hydraulic capacity of culverts. Pipeline operators should clear the culverts they intend to use prior to installing temporary pipelines. The pipeline operators should also inspect culverts regularly to make sure sedimentation has not occurred since the day the pipeline was installed inside the culvert.

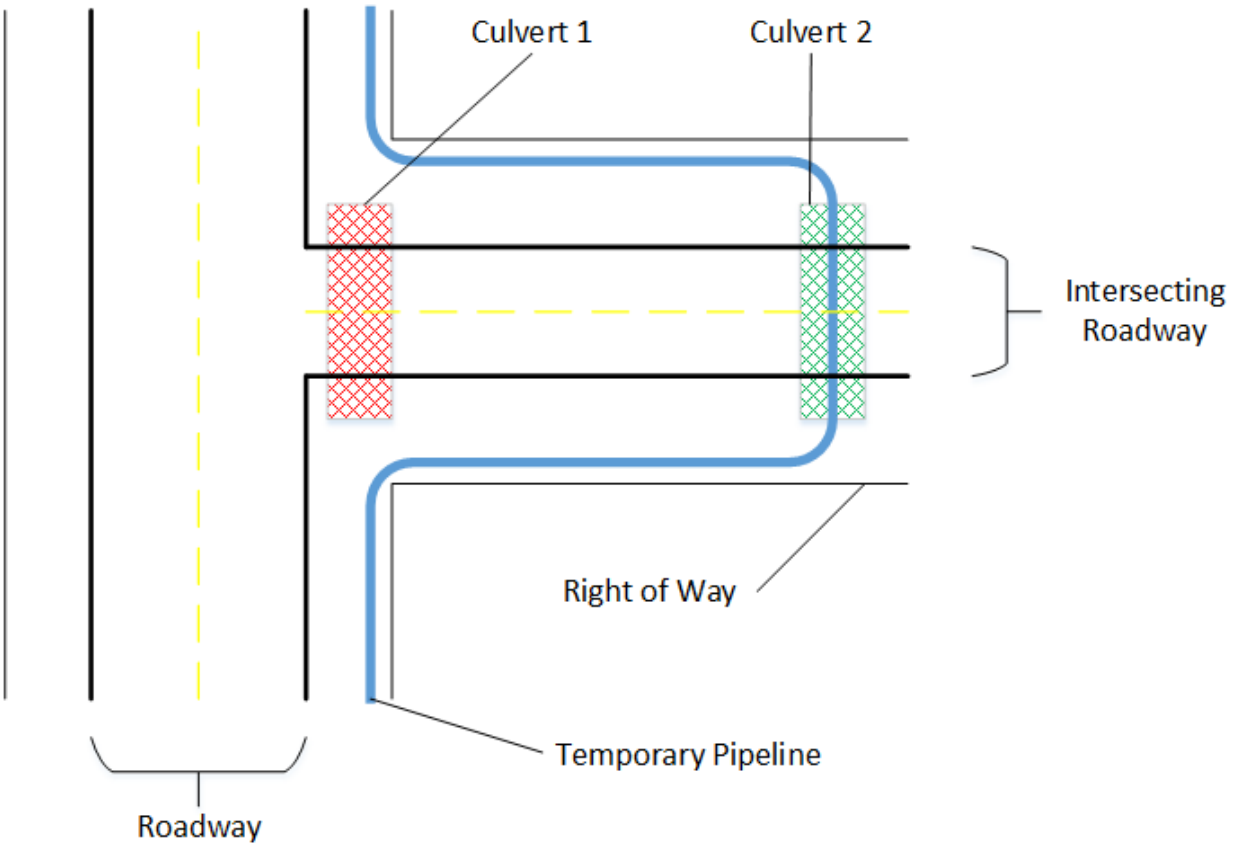
If a culvert has a safety end treatment, under no circumstances is the safety end treatment to be removed or altered. Figure 15 shows an example of a culvert safety end treatment. If a temporary pipeline cannot fit through a safety end treatment, then another culvert or method to cross under the road must be used.

Figure 15. Culvert with Safety End Treatment.

At the request of the district office (e.g., in anticipation of a heavy rainfall event), the pipeline operator must immediately remove the pipeline from a culvert. To facilitate this process, temporary pipelines must be equipped with shut-off valves on either side of the culvert.

Crossing Intersecting Roads

If a temporary pipeline crosses an intersecting road, the temporary pipeline may not occupy a culvert parallel to the state road unless it meets the sizing requirements in Table 1 or Table 2. In instances where the temporary pipeline does not meet the size requirements to occupy that culvert, the temporary pipeline should turn down the intersecting road, use another culvert to cross that road, and then proceed back along its route. Figure 16 shows an example of this situation. If the intersecting road is under the jurisdiction of another agency, such as a city or county, the pipeline operator must coordinate with that agency for any accommodation permits that might apply.



Note: Not to Scale.

Figure 16. Example of a Temporary Pipeline Crossing an Intersecting Street.

Other Crossings

If a temporary pipeline includes crossing bodies of water such as rivers or streams, additional authorizations by other agencies may be required prior to executing the lease agreement. If a temporary pipeline involves a bridge attachment to facilitate a crossing, advance coordination with the TxDOT Bridge Division is necessary. The TxDOT district office will provide additional information about using a bridge for a crossing and for coordinating with other agencies to cross a body of water.

Crossing a body of water or attaching a temporary pipeline to a bridge has specific requirements in addition to other provisions that might apply on a case-by-case basis. Requirements include installing shut-off valves on either side of the body of water or bridge and using continuous pipeline segments with no connections or joints between the shut-off valves. Temporary pipelines crossing over wetlands should use a single section of pipe to the extent possible. The shut-off valves should be placed sufficiently far away from a body of water so that if a leak occurs at the shut-off valve, water does not flow into the body of water.

PRE-PUMPING PRESSURE TEST

Temporary pipelines should be pressure tested prior to first being put in service and after being moved, repaired, or altered. The pressure test should consist of holding 125 percent of the maximum operating pressure for four hours without a leak or defect, in accordance with American Society of Mechanical Engineers (ASME) B31.4 and the Plastic Pipe Institute's *Guidance for Field Hydrostatic Testing of High Density Polyethylene Pressure Pipelines* (*28*, *29*).

The results of the test as well as any defects and repairs to the temporary pipeline should be documented and made available upon request. If any leaks are discovered, they should be repaired and the pipeline retested. Water used for pressure testing must not be discharged onto state property.

TEMPORARY PIPELINE OPERATION AND MAINTENANCE

VEGETATION MANAGEMENT

Vegetation management may be required before installing temporary pipelines, while temporary pipelines are in the field, and when temporary pipelines are removed. TxDOT will notify the pipeline operator if mowing is scheduled to occur during the duration of the lease. If mowing is scheduled, the pipeline operator is responsible for mowing the area from the right-of-way line to where their temporary pipelines are installed. Removal of vegetation other than grass, such as bushes or trees, is at TxDOT's discretion. The pipeline operator must not remove bushes or trees unless authorized by TxDOT.

ROUTINE MAINTENANCE

Frequency of Maintenance Inspections

While the temporary pipeline is in operation, inspections should be conducted at least twice daily. TxDOT may require more frequent inspections if necessary, particularly if the temporary pipeline transports water with a TDS greater than 3,000 mg/L. The pipeline operator must maintain an inspection and maintenance log for every temporary pipeline that should summarize when inspections occur, what maintenance issues are discovered, and what corrective actions are taken. This log should be made available upon request.

Methods of Inspection

Inspections of temporary pipelines should be conducted using a method that ensures an early, effective detection of anomalies such as leaks and spills, damage to the structural integrity of the pipeline, and excessive shifts in pipeline alignment (i.e., more than 6 inches from the original alignment).

Response to TxDOT Notifications

As part of the normal roadside maintenance inspection process, it is possible for TxDOT inspectors to observe temporary pipeline anomalies. Members of the public might also report temporary pipeline issues to TxDOT. Upon TxDOT's notification of an issue with a temporary pipeline, the pipeline operator must resolve the issue within 24 hours. The pipeline operator must also document the issue and its resolution in the inspection and maintenance log.

EMERGENCY MANAGEMENT

The use of aboveground temporary pipelines is limited to water with TDS up to 10,000 mg/L. Produced water (including flowback water) or any water with TDS greater than 10,000 mg/L should use a different mode of transportation (e.g., truck or underground pipelines). The following protocol applies in response to leaks or spills affecting aboveground temporary pipelines (see Table 3):

- **Fresh water (i.e., TDS up to 1,000 mg/L)**. For this type of water, inspections twice daily are sufficient. In case of any leaks or spills, the pipeline operator must repair the pipeline within 24 hours of detection. Further evaluation or reporting of the event is not necessary.

- **Slightly saline water (i.e., TDS greater than 1,000 and up to 3,000 mg/L)**. This type of water is acceptable to be transported in aboveground temporary pipelines because short exposure to this type of water would probably not result in significant impact on nearby vegetation or livestock. Inspections twice daily are sufficient. In case of any leaks or spills, the pipeline operator must repair the pipeline within 24 hours of detection. Further evaluation or reporting of the event is not necessary.

- **Moderately saline water (i.e., TDS greater than 3,000 and up to 10,000 mg/L)**. This type of water is not recommended to be transported in aboveground temporary pipelines, but exceptions could be made under certain circumstances at the discretion of the district engineer. Inspections should be conducted three times per day. However, a more stringent leak or spill response protocol must be applied. In case of any leaks or spills:

    - The pipeline operator must repair the pipeline within 24 hours of detection.

    - The pipeline operator must estimate the amount of water leaked or spilled and the potential environmental impact resulting from the leak or spill.

    - The pipeline operator must report the incident to TxDOT within 24 hours of detection of the incident so that TxDOT can document and begin to monitor the spill location. Long-term monitoring is likely to be expected.

    - If the impact of the leak or spill on vegetation in the affected area becomes evident, the pipeline operator must conduct a soil assessment and implement appropriate remediation solutions to restore the soil productivity and structure to the conditions prior to the incident. This includes restoring the vegetation in the affected area to its original condition. If TxDOT makes such restorations because of the inability of the pipeline operator to complete this task, the terms of the lease relating to the environment and liability insurance will apply as appropriate.

Table 3. Leak and Spill Response Protocol for Aboveground Temporary Pipelines.

Type of Water	What to Do after Leaks/Spills?
Fresh water (TDS ≤ 1,000 mg/L)	• The pipeline operator must repair the pipeline within 24 hours of detection.
Slightly saline water (1,000 < TDS ≤ 3,000 mg/L)	• The pipeline operator must repair the pipeline within 24 hours of detection.
Moderately saline water (3,000 <TDS ≤ 10,000 mg/L)	• The pipeline operator must repair the pipeline within 24 hours of detection. • The pipeline operator must estimate the amount of water leaked or spilled and the potential environmental impact resulting from the leak or spill. • The pipeline operator must report the incident to TxDOT within 24 hours of detection of the incident so that TxDOT can document and begin to monitor the spill location. Long-term monitoring is likely to be expected. • If the impact of the leak or spill on vegetation in the affected area becomes evident, the pipeline operator must conduct a soil assessment and implement appropriate remediation solutions to restore the soil productivity and structure to the conditions prior to the incident. This requirement includes restoring the vegetation in the affected area to its original condition. If TxDOT makes such restorations because of the inability of the pipeline operator to complete this task, the terms of the lease relating to the environment and liability insurance will apply as appropriate.

TEMPORARY PIPELINE LEASE COMPLETION

LEASE RENEWAL

The lease may be extended for one additional 90-day period under the same terms and conditions as the current lease by mutual written agreement prior to expiration of the initial lease agreement. To initiate a lease renewal, operators should submit a lease renewal request, form ROW-SW-RenewReq (*30*), and complete the lease extension, form ROW-SW-LeaseExt (*31*). If the extension is not executed before the initial 90-day period expires, the pipeline operator must remove all temporary pipelines and related equipment and then submit a new lease application.

REMOVAL TIMEFRAME

The pipeline operator must remove all temporary pipelines and related equipment upon the expiration of the lease agreement unless the lease agreement is terminated sooner.

MOBILIZATION FOR REMOVAL

The use of equipment is often necessary to expedite temporary pipeline removal. Equipment should be kept off roadway lanes and shoulders. Pipeline operators should follow the traffic control guidelines in the Field Safety Procedures section. The use of equipment should not damage vegetation, soil, backslopes, foreslopes, highway structures, or roadside drainage.

Site conditions should be evaluated prior to using equipment in the field. Rutting can be caused by equipment. It is the responsibility of the pipeline operator to return the right of way to its original condition after the work is complete. This restoration includes repairing any damage to the soil, vegetation, and infrastructure in the right of way. More information about repairing damage caused while working in the right of way can be found in the Return Right Of Way To Original Condition section.

Depending on the type of equipment used, horizontal and vertical clearance should be evaluated. Equipment should not interfere with overhead utilities or other obstructions, and equipment should not overhang pavement or interfere with traffic. Narrow rights of way or those with significant roadside vegetation may not have adequate clearance for equipment.

When disassembling temporary pipelines and related equipment, the temporary pipelines and related equipment should be removed promptly and not stored in the right of way.

RETURN RIGHT OF WAY TO ORIGINAL CONDITION

If any damage or alterations are done to the right of way during temporary pipeline installation, operation, or removal, the necessary repairs should be made when the temporary pipelines are removed. Damage or alterations that need repair may include grass growth that requires mowing; damage to vegetation that requires replanting or reseeding; rutting from vehicles or equipment that requires minor grading; and repair of backslopes, foreslopes, and drainage patterns. Notify TxDOT immediately if damage is caused to highway structures.

REFERENCES

1. C.A. Quiroga, E.G. Fernando, J.H. Oh. *Energy Developments and the Transportation Infrastructure in Texas: Impacts and Strategies*. Report FHWA/TX-12/0-6498-1. Texas Transportation Institute, Texas Department of Transportation, College Station, Texas, March 2012. http://tti.tamu.edu/documents/0-6498-1.pdf. Accessed July 11, 2017.
2. C.A. Quiroga, I. Tsapakis, E. Kraus, J. Le, A. Wimsatt. *Oil and Gas Energy Developments and Changes in Pavement Conditions in Texas*. Final Report. Report PRC 14-35F. Transportation Policy Center, Texas A&M Transportation Institute, College Station, Texas, March 2015. http://tti.tamu.edu/documents/PRC-14-35F.pdf. Accessed July 11, 2017.
3. C.A. Quiroga, I. Tsapakis. *Oil and Gas Energy Developments and Changes in Crash Trends in Texas*. Final Report. Report PRC 15-35 F. Transportation Policy Center, Texas A&M Transportation Institute, College Station, Texas, October 2015. http://tti.tamu.edu/documents/PRC-15-35-F.pdf. Accessed July 11, 2017.
4. C.A. Quiroga, W. Holik, J. Li, I. Tsapakis, D. Bierling. *Temporary Saltwater Pipelines: Current Practice and Recommendations*. Report FHWA/TX-17/0-6886-1. Texas A&M Transportation Institute, Texas Department of Transportation, College Station, Texas, August 2017.
5. *Roadway Design Manual*. Texas Department of Transportation, Austin, Texas, 2014. http://onlinemanuals.txdot.gov/txdotmanuals/rdw/rdw.pdf. Accessed July 11, 2017.
6. *Roadside Vegetation Management Manual*. Texas Department of Transportation, Austin, Texas, 2013. http://onlinemanuals.txdot.gov/txdotmanuals/veg/veg.pdf. Accessed July 11, 2017.
7. *Texas Manual on Uniform Traffic Control Devices, Part 6*. Texas Department of Transportation, Austin, Texas, October 2014. https://ftp.dot.state.tx.us/pub/txdot-info/trf/tmutcd/2011-rev-2/revision-2.pdf. Accessed July 11, 2017.
8. Traffic Standards. Texas Department of Transportation, Austin, Texas, 2017. https://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/toc.htm. Accessed July 11, 2017.
9. Compliant Work Zone Traffic Control Device List. Texas Department of Transportation, Austin, Texas, 2015. ftp://ftp.txdot.gov/pub/txdot-info/trf/pdf/cwztcd.pdf. Accessed July 11, 2017.
10. *Project Development Process Manual*. Texas Department of Transportation, Austin, Texas, July 2014. http://onlinemanuals.txdot.gov/txdotmanuals/pdp/pdp.pdf. Accessed July 11, 2017.
11. *Manual for Assessing Safety Hardware*. American Association of State Highway and Transportation Officials, 2016.
12. *Use of Right of Way by Others Manual*. Texas Department of Transportation, Austin, Texas, 2015. http://onlinemanuals.txdot.gov/txdotmanuals/use/use.pdf. Accessed July 11, 2017.
13. *Occupational Safety Manual*. Texas Department of Transportation, Austin, Texas, undated.

14. Lease Application for Saltwater Pipeline Facility to be Located on State Right of Way. Form ROW-SW-APP, Texas Department of Transportation, Austin, Texas, May 2017. http://www.txdot.gov/txdoteforms/GetForm?formName=/SWAPP.pdf&appID=/ROW&status=/reportError.jsp&configFile=WFServletConfig.xml. Accessed July 11, 2017.

15. Temporary Saltwater Pipeline Lease. Form ROW-SW-LeaseTemp, Texas Department of Transportation, Austin, Texas, May 2017. http://www.txdot.gov/txdoteforms/GetForm?formName=/SWLeaseTemp.pdf&appID=/ROW&status=/reportError.jsp&configFile=WFServletConfig.xml. Accessed July 11, 2017.

16. Leasing of Right of Way to Saltwater Pipeline Operators. Texas Administrative Code, Chapter 21, Right of Way, October 12, 2014. http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=43&pt=1&ch=21&sch=R&rl=Y. Accessed July 11, 2017.

17. Texas Natural Resource Code, Title 3 Oil and Gas, Subtitle B Conservation and Regulation of Oil and Gas, Chapter 91 Provisions Generally Applicable, Subchapter T Saltwater Pipelines. http://www.statutes.legis.state.tx.us/Docs/NR/htm/NR.91.htm#T. Accessed July 11, 2017.

18. W.D. Williams, J.E. Sherwood. Definition and Measurement of Salinity in Salt Lakes. *International Journal of Salt Lake Research*, 3.1 (1994): 53–63.

19. Sec. 36.117. Texas Water Code, Chapter 36, Subchapter D. http://www.statutes.legis.state.tx.us/Docs/SDocs/WATERCODE.pdf. Accessed July 11, 2017.

20. LBG–Guyton Associates. *Brackish Groundwater Manual for Texas Regional Water Planning Groups*. Texas Water Development Board, Austin, Texas, 2003. http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/2001483395.pdf. Accessed July 11, 2017.

21. J.P. Nicot, A.K. Hebel, S.M. Ritter, S. Walden, R. Baier, P. Galusky, J. Beach, R. Kyle, L. Symank, C. Breton. *Current and Projected Water Use in the Texas Mining and Oil and Gas Industry*. Texas Water Development Board, Austin, Texas, 2011. http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_MiningWaterUse.pdf. Accessed July 11, 2017.

22. D.K. Nordstrom, D.W. Blowes, C.J. Ptacek. Hydrogeochemistry and Microbiology of Mine Drainage: An Update. *Applied Geochemistry*, 57 (2015): 3–16.

23. 43 TAC 21.57. Texas Administrative Code, Title 43, Chapter 21, Section 21.57, Temporary Saltwater Pipeline. http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=43&pt=1&ch=21&rl=57. Accessed July 11, 2017.

24. 29 CFR 1926, Safety and Health Regulations for Construction, undated. https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1926. Accessed July 11, 2017.

25. Texas Utilities Code, Title 5, Chapter 251. Underground Facility Damage Prevention and Safety. http://www.statutes.legis.state.tx.us/Docs/UT/htm/UT.251.htm. Accessed July 11, 2017.

26. Texas Utilities Code, Title 5, Chapter 251. http://www.statutes.legis.state.tx.us/Docs/UT/htm/UT.251.htm. Accessed July 11, 2017.

27. 43 TAC 21.40. Texas Administrative Code, Title 43, Chapter 21, Section 21.40, Underground Utilities. http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=T&app=9&p_dir=F&p_rloc=169413&p_tloc=14995&p_ploc=1&pg=2&p_tac=&ti=43&pt=1&ch=21&rl=40. Accessed July 11, 2017.

28. *Pipeline Transportation Systems for Liquids and Slurries*. American Society of Mechanical Engineers (ASME) Standard B31.4, New York, New York, 2016.

29. *Guidance for Field Hydrostatic Testing of High Density Polyethylene Pressure Pipelines: Owner's Considerations, Planning, Procedures, and Checklists*. Publication TN-46/2013a, Plastic Pipe Institute, Irving, Texas, June 2013.

30. Saltwater Pipeline Lease Renewal Request Form, Texas Department of Transportation, June 2017. http://www.txdot.gov/txdoteforms/GetForm?formName=/SWRenewReq.pdf&appID=/ROW&status=/reportError.jsp&configFile=WFServletConfig.xml. Accessed July 11, 2017.

31. Extension of Saltwater Pipeline Lease, Texas Department of Transportation, May 2017. http://www.txdot.gov/txdoteforms/GetForm?formName=/SWLeaseExt.pdf&appID=/ROW&status=/reportError.jsp&configFile=WFServletConfig.xml. Accessed July 11, 2017.

APPENDIX. TEMPORARY PIPELINE LEASE CHECKLIST

The following checklist is for use by pipeline operators when preparing the documentation for submitting a lease application and for executing a lease agreement with TxDOT for installing and operating an aboveground temporary pipeline within the right of way.

Lease Application Phase

- ☐ Download Form ROW-SW-APP from http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/row.html.
- ☐ Identify coordinates of beginning and ending locations in state right of way.
- ☐ Include spatial date file of proposed temporary pipeline alignment.
- ☐ Determine temporary pipeline distance in feet.
- ☐ Select surface lease for a period of 90 days or less.
- ☐ Indicate the diameter and material of the temporary pipeline.
- ☐ Indicate if a bridge attachment is requested.
- ☐ Indicate if crossing in a culvert is requested.
- ☐ Include total dissolved solids (TDS) in water.
- ☐ Include operating and burst pressures (in psi).
- ☐ Include nominal and maximum flow rate (in gpm).
- ☐ Submit application to relevant TxDOT district office.

Lease Agreement Phase

- ☐ Review lease Form ROW-SW-LeaseTemp, sent by TxDOT, if application is approved.
- ☐ Include start and end dates of the lease (not to exceed 90 days).
- ☐ Include permit numbers and coordinates for water origins and destinations.
- ☐ Include map of temporary pipeline alignment.
- ☐ Include spatial data file of temporary pipeline alignment.
- ☐ Include description of culverts that will be occupied.
- ☐ Include TDS in water.
- ☐ Include certificate of liability insurance.
- ☐ Pay lease rent to TxDOT.

Before Mobilizing to the Field

- ☐ Submit traffic control plan to the relevant TxDOT area office or maintenance section for approval. Approval must be received prior to starting any work.
- ☐ Notify appropriate area office or maintenance section no later than 48 hours before starting work. This information is included in the lease agreement.
- ☐ Keep a copy of the lease and approved traffic control plan on site while workers are present.