



# DESIGN & CONSTRUCTION STANDARD SPECIFICATIONS

## Wireline Occupancies

OFFICE OF:  
VICE PRESIDENT – ENGINEERING  
JACKSONVILLE, FLORIDA  
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<b>Part 1 – Introduction</b>	<b>PAGE</b>
1.1 Scope .....	1
1.2 Definitions .....	1
1.3 Application for Occupancy .....	1
1.4 Right of Entry .....	2
1.5 Site Inspection .....	2
1.6 Information Required for Submission .....	2
1.7 Notification to Proceed with Outside Party Request Form .....	3
 <b>Part 2 – General Requirements</b>	
2.1 General .....	5
2.2 Aerial Wirelines .....	5
2.2.1 Location .....	5
2.2.2 Clearances .....	5
2.2.3 Signs .....	6
2.2.4 Inductive Interference .....	6
2.3 Subgrade Wirelines .....	7
2.3.1 Location .....	7
2.3.2 Manholes .....	8
2.3.3 Depth of Installation .....	8
 <b>Part 3 – DESIGN</b>	
3.1 General .....	10
 <b>Part 4 – CONSTRUCTION</b>	
4.1 General .....	10
4.2 Safety Requirements .....	10
4.3 Cranes .....	11
4.4 Installation Method .....	11
 <b>Part 5 – PUBLICATION REFERENCES</b>	
5.1 Guidelines and CSXT Documents .....	12
 <b>Tables</b>	
Table 1 Underclearance of Wires of Various Voltages .....	13

**END OF TABLE OF CONTENTS**

## **Part 1 - INTRODUCTION**

### **1.1 Scope**

- a) This specification applies to the design and installation of utility wires and cables (power or communication), crossing and/or parallel, over or under railroad tracks and property owned by CSX Transportation (CSXT). The specification also applies to facilities and tracks owned by others (sidings, industry tracks, etc.) over which CSXT operates its equipment.
- b) It is to be clearly understood that CSXT owns its right-of-way for the primary purpose of operating a railroad. All occupancies shall therefore be designed and constructed so that rail operations and facilities are not interfered with, interrupted, or endangered. In addition, the proposed facility shall be located to minimize encumbrance to the right-of-way so that the railroad will have unrestricted use of its property for current and future operations.

### **1.2 Definitions**

CSXT	CSX Transportation
COS	Corridor Occupancy Services
Owner (Applicant)	Individual, Corporation, or Government Agency desiring occupancy of CSXT property.
Professional Engineer	Engineer licensed in the state where the facilities are to be constructed.
Industry Tracks	Tracks located off of CSXT's right-of-way, serving an industry.
Wirelines	Electrical utility lines, communication wires (e.g. optical ground wires, fiber optic cables, coax cables, etc.), which can be installed subgrade or aerial.

### **1.3 Application for Occupancy**

- a) Owner (Applicant) desiring occupancy of CSXT property by wireline occupations must satisfy the following: receive approval by CSXT of all engineering and construction details, execute an appropriate CSXT occupational agreement, and remit payment of any required fees and/or rentals specified therein.
- b) Occupancy applications shall be completed in full with all of the required information requested in order for the application to be processed. Review the entire application package, as well as the engineering specifications, before completing the application.
- c) Applications must be submitted through the CSX Property Portal. Visit [www.csx.com](http://www.csx.com) to establish an account and submit an application. Once on the site, use the following path: CUSTOMERS→CSX Real Property→CSX Property Portal.

#### 1.4 Right of Entry

- a) Entry onto CSXT property for the purpose of conducting surveys, performing field inspections, obtaining soil information, or for any other purpose associated with the design and construction of a proposed utility occupancy, will not be allowed without a proper Non-Environmental Right of Entry permit prepared by CSXT. The applicant must apply for the entry permit and pay the associated fees. To submit a Non-Environmental Right of Entry permit application, access the CSX website at [www.csx.com](http://www.csx.com). Once on the site, please utilize links by following this path: CUSTOMERS→CSX Real Property→ Permitting: Utility Installations and Rights of Entry→Rights of Entry Permits Submit a Non-Environmental Right of Entry Application”.
- b) The issuance of an entry permit does not constitute authority to proceed with any construction. Construction cannot begin until a formal agreement is executed by CSXT and the Applicant receives permission from the designated inspection agency of CSXT to proceed with the work.

#### 1.5 Site Inspections

- a) For longitudinal occupancy of CSXT property, a site inspection along the proposed wireline route may be required. Contact the longitudinal manager for further instructions before final design plans are prepared. When a site inspection is required, the applicant and/or the engineer must meet with a CSXT Field Representative to view the entire length of the proposed occupancy.
- b) Prior to the site inspection the applicant must submit the following information:
  - i) A plan view of the proposed route showing all tracks, both CSXT right-of-way lines, and all other facilities located on the right-of-way. The distance from the proposed wireline to the adjacent track and to CSXT’s right-of-way must be shown.
  - ii) A complete application form.
  - iii) Typical cross sections along the proposed route.
- c) Site inspections for wireline crossings are not required unless, in the opinion of CSXT, the size and location of the facility warrant an inspection.

#### 1.6 Information Required for Submission

- a) All plans and documents required in the online application shall be submitted per instructions. Visit [www.csx.com](http://www.csx.com) for more details. Once on the site please follow this path: Customers→CSX Real Property→Permitting: Utility Installations and Rights of Entry→Utility Permits.
- b) Failure to follow these instructions may result in the application not being processed.

### **1.7 Notification to Proceed with Construction**

- a)** After approval of the engineering plans and full execution of the facility encroachment agreement, an OP request reference number will be provided to you allowing you to apply for flagging and inspection. Proceed to the CSXT Property Portal to submit an Outside Party Service Request (OP request) for flagging and inspection (if required). All OP requests should be submitted at a minimum of (30) business days prior to the start of construction. You can access CSX Property Portal at [www.csx.com](http://www.csx.com). Once on the site please follow this path: CUSTOMERS→CSX Real Property→CSX Property Portal.
- b)** Once the OP Form is received, the Owner or their Contractor will be contacted to discuss construction scheduling.
- c)** CSXT will determine if the project requires flagging, construction monitoring, or both. All costs associated with flagging and/or construction monitoring will be the responsibility of the Owner. CSXT, at its sole discretion, may elect to have the Owner remit payment for the estimated flagging/construction monitoring cost in advance or elect to invoice the Owner the actual cost as incurred.

**END OF PART 1**

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## **Part 2 – General Requirements**

### **2.1 General**

- a) The following are requirements for aerial wireline installations on CSX property for both crossings and longitudinal routes. For all proposed longitudinal occupations, the longitudinal project manager should be contacted to discuss the project specifics and additional requirements.

### **2.2 Aerial Wirelines**

#### **2.2.1 Location**

- a) The poles or towers supporting the crossing span should be located outside CSXT's right-of-way, or not less than 25 feet from the nearest track, whichever is greater. If locating the poles or towers outside the right of way is not possible, the side clearance of poles and towers from the nearest track rail shall be not less than 25 feet. Structures and guy wires shall be placed in a location that does not interfere with drainage and ditches.
- b) Crossing poles and towers shall be located as far as practicable from flammable structures. The space around the poles and towers shall be kept free from underbrush, grass, and other flammable material.
- c) Wirelines shall be located, where practicable, to cross tracks at approximate right angles to the track, but not less than 45 degrees.
- d) The alignment shall be laid as straight and direct as possible between the points where the aerial line enters and leaves the property of CSXT.
- e) For the protection of the wire crossing and railroad maintenance operations, the wire crossing should be located 1,000 feet or more from any railroad bridge, trestle, or large culvert. Where necessary to locate the wire crossing less than 1,000 feet from such bridge, trestle, or large culvert, the vertical clearance of the wire shall be not less than 50 feet above the top-of-rail.
- f) Wirelines running longitudinally along CSXT's right-of-way shall be constructed as close to property lines as possible, except in cases where doing so will interfere with Railroad operations, surface drainage, or soil stability.

#### **2.2.2 Clearances**

- a) The minimum distance above top-of-rail for lines carrying voltage is shown in Table 1, as well as the minimum distance required between wires. Proper conductor separation is required to eliminate any possibility of the phase conductors coming in contact with each other and resulting in a potential flashover.
- b) Guy wires and suspension cable systems may be located no closer than 27 feet above top-of-rail.



### 2.2.3 Signs

- a) All poles or structures supporting the crossing span shall be plainly marked with the name, initials, or trademark and the pole numbers, if used, of the Owner. When required by CSXT, the Owner shall place on all crossing structures located on the property of CSXT, warning signs of approved design.
- b) Owners of the Wirelines shall designate the location of such cables by placing and maintaining durable weatherproof signs or markers clearly visible on each side of the track, preferably at or near the CSXT right-of-way or property line to aid in the prevention of damage to the cable as a result of use of Railroad's property. Signs should display the name and address of the owner and emergency telephone number. Signs are not required when the crossing is located in a public street or road.
- c) All subgrade Wirelines shall be constructed and properly marked with signs, in accordance with "Design and Construction Standard Specifications for Pipeline Occupancies."

### 2.2.4 Inductive Interference

- a) An inductive interference coordination study is required for all proposed electrical power longitudinal occupations.
- b) Additionally, any crossing other than 90 degrees with respect to the tracks, an inductive interference study may be required to be provided, which is at the discretion of CSXT.
- c) All agreements covering crossings and longitudinal occupations will include provisions that the owner provides appropriate remedies, at their own expense, to correct any inductive interference with CSXT facilities. All existing utilities within CSXT's right-of-way will need to be addressed in the inductive interference study.
- d) Physical Configuration
  - Provide drawings showing the supporting towers and the location of all current carrying conductors, including any shield or static wires. Indicate whether or not the conductors are bonded to the towers. Indicate the distance from towers to tracks. Define the phase relationship of the conductors. For towers supporting more than one transmission or distribution line, provide phase relationships among all conductors. Provide an estimate of the tower earth ground resistance. Describe the location of any substations.
- e) Transmission Line Load Currents and Voltages
  - Provide line voltages and the nominal and worst case load currents for all transmission and distribution lines on the towers. If available, provide a history of line currents. Provide also an estimate of any future growth in the loads.
- f) Transmission Line Electrical Design
  - State whether the line is delta or grounded wye configuration, or a combination of these. Provide an estimate of the nominal and worst case unbalanced current

and its return path. The design should also address whether or not phase swapping is required in order to mitigate the risk of inductive coupling.

- g) Fault Current Description
  - Provide the time history waveforms of fault currents. Also, provide a description of any fault current scenarios and an estimate of how frequently they would occur.
- h) Listed below, but not limited to, are additional items that should be addressed in the inductive interference study:
  - Induced voltages across insulated joints for all expected conditions
  - Rail to ground voltages at insulated joints for all expected conditions
  - Expected frequency of fault events

## 2.3 Subgrade Wirelines

### General

- a) The following section applies to power Wirelines. Fiber Wirelines should refer to the CSXT Design and Construction Specifications for Pipelines.
- b) For all proposed longitudinal occupancies, the longitudinal project manager should be contacted to discuss the project specifics and additional requirements.
- c) The information in this section pertains to subgrade Wireline installations.

### 2.3.1 Location

- a) Wirelines laid longitudinally on CSXT's right-of-way shall be located as far as practicable from any tracks or other important structures and as close to the railroad property line as possible. Longitudinal Wirelines must not be located in earth embankments or within ditches located on the right-of-way.
- b) Wirelines shall not be placed within a culvert, under railroad bridges, nor closer than 45 feet to any portion of any railroad bridge, building, or other important structure, except in special cases, and then by special design, as approved by CSXT's AVP of Engineering.
- c) Wirelines shall be located, where practicable, to cross tracks at approximate right angles to the track, but not less than 45 degrees.
- d) The alignment shall be laid as straight and direct as possible between the points where the subgrade line enters and leaves the property of CSXT.
- e) Wirelines shall not be located within the limits of a turnout (switch) when crossing the track. The limits of the turnout extend from the point of the switch to 15 feet beyond the last long timber.

### 2.3.2 Manholes

- a) Manholes, pull boxes, hand holds, and terminals in the subgrade crossings should be located off CSXT's right-of-way where possible.

### 2.3.3 Depth of Installation: Construction of Underground Crossings

- a) Subgrade Wireline crossings and longitudinals shall be designed and constructed in accordance with the CSXT Design and Construction Specifications for Pipeline Occupancies.
- b) *Under special circumstances*, underground crossings of power supply cables with maximum voltage of 750 volts may be installed by pushing (jacking) a galvanized steel pipe under the tracks, provided such pipe extends at least 15 feet beyond the outside rail on each end of the crossing and the cable is buried at least 4 feet below the base of rail and 3 feet below ditch bottoms at all other points on the property of CSXT. Measurements to the ends of the conduits shall be to the outside rail and made at right angles to the track. Additional lengths will be required for crossings in fill sections, those at angles of less than ninety degrees (90°), and for multi-track crossings. Generally, on fills, two feet beyond the toe of the slopes or three feet beyond the ditch should be sufficient. All ducts and/or encasements beneath the tracks must be capable of withstanding Cooper E-80 loading and conform to CSX specifications and AREMA guidelines. Any conduits and/or encasements larger than four inches will be governed entirely by those specifications which normally cover pipelines. *If this section should apply to your project, CSXT should be contacted prior to application submittal.*
- c) Underground crossings of communication cables of low voltage shall conform to “b” above, except that encasement may, at the discretion of CSXT’s AVP of Engineering, be restricted to ten feet beyond the outside rail of spur or sidetracks measure at right angles to the track. As in “b” above, additional lengths will be required for crossings in fill sections, etc. Generally, the above will apply in paved street sections.
- d) Underground crossings of power supply cables operating above 750 volts shall be enclosed in galvanized steel pipe or approved concrete encased duct for mechanical protection of the cable. No cable of this potential which is unprotected will be permitted. This type of installation shall be designed in accordance with the CSXT Design and Construction Specifications for Pipelines.

END OF PART 2

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## **Part 3 – Design**

### **3.1 General**

- a) All substructure and superstructure designs of towers or poles must be accompanied by engineering computations and date stamped by a licensed Professional Engineer, who is registered in the state where the facilities are to be constructed. All towers or poles to be installed on CSXT property must meet or exceed the industry standards regarding their design and usage. Double cross-arms are required on poles adjacent to track.
- b) In addition to the requirements of these specifications, the underground crossing and/or longitudinal is to conform to the requirements of the National Electrical Safety Code, as published by the National Standards Institute, Inc., the latest revised edition of same being controlling. The crossing and/or longitudinal is also to conform to the requirements of any local or state laws or regulations of any local code enforcing authority that may be in effect at the time of the installation.
- c) For additional design requirements pertaining to subgrade installations, reference the CSXT “Design and Construction Standard Specifications for Pipeline Occupancies” for the approved installation methods and the corresponding requirements.

## **Part 4 – Construction**

### **4.1 General**

- a) Work shall not interfere with CSXT’s communication and signal system and cables.
- b) Overhead power and communication lines shall be constructed in accordance with the National Electric Safety Code (current edition), Part 2, “Safety Rules for the Installation and Maintenance of Overhead Electric Supply and Communication Lines,” except where more conservative requirements are noted within this document.

### **4.2 Safety Requirements**

- a) All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of trains nor damage, destroy, or endanger the integrity of railroad facilities. All work on or near CSXT property shall be conducted in accordance with CSXT safety rules and regulations. Specifically all licensee’s employees and agents, while on CSXT property, shall be required to wear all proper personal protective equipment (PPE), as outlined in the CSXT Safeway Manual. The contractor and its employees shall comply with the CSXT safety rules at all times while occupying CSXT’s property. Operations will be subject to CSXT inspection at any and all times.
- b) Whenever equipment or personnel are working closer than 25 feet from the centerline of an adjacent track, that track shall be considered as being obstructed. Insofar as possible, all operations shall be conducted no less than this distance. All operations shall be conducted only with the permission of, and as directed by, a duly qualified railroad employee present at the site of the work. All costs related to Railroad protection will be passed on to the applicant.

- c) Crossing of tracks at grade by equipment and personnel is prohibited except by prior arrangement with and as directed by CSXT.

#### **4.3 Cranes**

- a) Reference the CSX Public Projects Manual, which can be found on [www.csx.com](http://www.csx.com), for specific erection and rigging requirements and required construction submittals.

#### **4.4 Installation Method**

- a) For subgrade installations, reference the CSXT “Design and Construction Standard Specifications for Pipeline Occupancies” for the approved installation methods and the corresponding requirements.

**END OF PART 4**

## **Part 5 – Publication References**

### **5.1 Guidelines and CSX Documents**

Guidelines/Documents	Contact Information
AREMA	The American Railway Engineering and Maintenance-of-Way Association 4501 Forbes Blvd., Suite 130 Lanham, MD 20706 Tel: 301-459-3200
CSX Transportation Pipeline Occupancy Design & Construction Standard Specifications	500 Water Street Jacksonville, FL 32202
CSX Transportation <b>Public Project</b> Information For Construction and Improvement Projects that May Involve the Railroad	500 Water Street Jacksonville, FL 32202

- a) NOTE: If other than AREMA guidelines are referred to for design, materials, or workmanship on the plans and specifications for the work, then copies of the applicable sections of such other specifications referred to shall accompany the plans and specification for the work.

**END OF PART 5**

**Table 1**

FOR INFORMATION ONLY  
 MINIMUM REQUIREMENTS FOR  
 UNDERCLEARANCE OF WIRES OF VARIOUS  
 VOLTAGES

<b><u>NOMINAL L-L VOLTAGE</u></b>	<b><u>OVERHEAD CLEARANCE</u></b>	<b><u>MINIMUM BETWEEN WIRES</u></b>
750 and below	27' - 0"	4' - 0"
To - 15,000	28' - 0"	6' - 0"
To - 50,000	30' - 0"	6' - 0"
69,000	30' - 8"	6' - 8"
115,000	32' - 2"	8' - 2"
138,000	33' - 0"	9' - 0"
345,000	39' - 10"	15' - 10"
500,000	45' - 0"	21' - 0"
745,000	53' - 2"	29' - 2"
765,000	53' - 10"	29' - 10"

Calculation for overhead clearance is 30' - 0" plus 0.4" per 1,000 volts over 50,000 volts.

**DEFINITIONS:**

**NOMINAL L-L VOLTAGE** - - Means Line-to-Line Voltage

**OVERHEAD CLEARANCE** - - The measured distance (in feet) from the top of the high rail to the bottom of sag of the bottom wire.

NOTE 1: The minimum clearance between the top wire of any pole line and any proposed overhead guy wire shall not be less than 4' - 0".

NOTE 2: The minimum clearance from crossing gate tips, cantilever structures, signal masts, signal and other bridges etc. shall conform to the National Electrical Safety Code, Section 23, Rule 234, but in no case shall the overhead clearance shown in the above table be reduced.