



RAILROAD COORDINATION MANUAL OF INSTRUCTION

Utah Department of Transportation
May 2015



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TABLE OF CONTENTS

Contents

TABLE OF CONTENTS.....	i
ACRONYMNS AND ABBREVIATIONS.....	v
CHAPTER 1:	1
INTRODUCTION.....	1
1.1. GENERAL.....	1
1.2. MANUAL ORGANIZATION.....	3
1.3. ROLES AND RESPONSIBILITIES.....	3
1.4. DEFINITIONS OF SELECTED TERMS USED IN THIS MANUAL.....	4
1.5. CURRENT LIST OF ACTIVE RAILROADS IN THE STATE OF UTAH*.....	7
CHAPTER 2:	8
LAWS, REGULATIONS, STANDARDS, AND REFERENCES.....	8
2.1. FEDERAL LAWS, REGULATIONS, STANDARDS AND REFERENCES.....	8
2.2. STATE LAWS, REGULATIONS, STANDARDS AND REFERENCES.....	8
2.2.1. CODES AND RULES.....	8
2.2.2. UDOT STANDARD DRAWINGS, DOCUMENTS AND SPECIFICATIONS.....	9
2.3. RAILROAD STANDARDS AND REFERENCES.....	10
2.4. NATIONAL ASSOCIATION STANDARDS AND REFERENCES.....	11
2.5. HORIZONTAL AND VERTICAL CLEARANCES.....	11
2.5.1. AREMA CLEARANCES.....	12
2.5.2. MUTCD CLEARANCES.....	13
2.5.3. UDOT CLEARANCES.....	13
2.5.4. FHWA CROSSING SIGHT DISTANCES.....	14
CHAPTER 3:	15
CROSSING PROJECT COORDINATION PROCESS.....	15

3.1.	TYPES OF CROSSING PROJECTS.....	15
3.1.1.	HIGHWAY IMPROVEMENT PROJECTS.....	15
3.1.1.1.	GRADE SEPARATION PROJECTS.....	15
3.1.1.2.	DESIGN BUILD PROJECTS	16
3.1.1.3.	LOCAL AGENCY PROJECTS	16
3.1.2.	CROSSING SAFETY IMPROVEMENT PROJECTS.....	16
3.1.3.	RAIL TRANSIT PROJECTS	17
3.2.	GENERAL RAILROAD COORDINATION INFORMATION	18
3.2.1.	DIAGNOSTIC TEAM	18
3.2.2.	NEW CROSSINGS.....	20
3.2.3.	GENERAL UTILITY GRADE CROSSING ENCROACHMENT PROCEDURES .	21
3.2.4.	CROSSING CLOSURES.....	21
3.2.5.	FUNDING AUTHORIZATION AND APPORTIONMENT OF COSTS.....	21
3.2.6.	PUBLIC NOTICE	22
3.2.7.	RAILROAD CROSSING INVENTORY	22
3.3.	PROJECT STAFF ORGANIZATION	23
3.3.1.	HIGHWAY IMPROVEMENT PROJECTS.....	23
3.3.2.	SAFETY IMPROVEMENT PROJECTS.....	23
3.4.	UDOT PROJECT DELIVERY NETWORK.....	24
3.4.1.	Utility Discipline Track, At Grade Railroad Crossings	25
3.4.2.	Structures Discipline Track, Grade Separation Structures	30
3.5.	CRITICAL ITEMS AND PROCESSES	35
3.5.1.	RIGHT-OF-WAY PROCESSES AND ACQUISITIONS	35
3.5.1.1.	Union Pacific Railroad	36
3.5.1.2.	Utah Transit Authority.....	37
3.5.1.3.	Acquiring Property Rights on Behalf of Railroads.....	37
3.5.2.	BUY AMERICA REQUIREMENTS.....	37
3.5.3.	EARLY COORDINATION AND ENGINEERING SUBMITTALS.....	39
3.5.4.	FEDERAL REQUIREMENTS FOR RAILROAD COMPANY PARTICIPATION IN GRADE SEPARATION STRUCTURE COSTS	40
CHAPTER 4:	42

RAILROAD AGREEMENTS	42
4.1. FEDERAL RAILROAD AGREEMENT REQUIREMENTS	42
4.2. STATE RAILROAD AGREEMENT REQUIREMENTS	43
4.2.1. SUMMARY OF UPRR MASTER AGREEMENT FOR AT GRADE CROSSING SAFETY IMPROVEMENT PROJECTS DATED MARCH 6, 2013.....	44
4.2.2. SUMMARY OF UNION PACIFIC RAILROAD AGREEMENTS	46
4.2.3. SUMMARY OF UTAH TRANSIT AUTHORITY AGREEMENTS	49
4.3. HIGHWAY CROSSING DESIGN SUBMITTALS	51
4.3.1. ANTICIPATED COSTS ASSOCIATED WITH CROSSING PROJECTS	51
4.4. GRADE SEPARATED CROSSINGS.....	52
4.5. AGREEMENT PREPARATION AND IMPLEMENTATION.....	52
CHAPTER 5:	54
RAILROAD COORDINATION DURING CONSTRUCTION.....	54
5.1. PRECONSTRUCTION CONFERENCE, NOTIFICATION TO RAILROAD.....	54
5.2. CONTRACTOR RIGHT OF ENTRY	55
5.3. INSURANCE REQUIREMENTS.....	55
5.4. FLAGGING AND PROTECTIVE SERVICES	56
5.5. SAFETY TRAINING REQUIREMENTS.....	59
5.6. MINIMUM SAFETY REQUIREMENTS FOR CONTRACTORS.....	60
5.6.1. PERSONAL PROTECTIVE EQUIPMENT (PPE).....	60
5.7. CONSTRUCTION SUBMITTALS	60
5.8. CONSTRUCTION FORMS.....	61
5.9. RAILROAD RESPONSIBILITIES DURING CONSTRUCTION.....	62
5.10. RAILROAD PERFORMED WORK.....	62
5.11. UDOT RESIDENT ENGINEER RESPONSIBILITIES.....	63
CHAPTER 6:	64
PROJECT BILLING AND CLOSEOUT	64
CHAPTER 7:	68
UTILITY ENCROACHMENTS IN RAILROAD RIGHTS-OF-WAY	68
7.1. UTAH TRANSIT AUTHORITY.....	68
7.2. UNION PACIFIC RAILROAD COMPANY	68

CHAPTER 8:	70
MAINTENANCE COORDINATION.....	70
8.1. MAINTENANCE RESPONSIBILITES.....	70
8.1.1. RAILROAD CONTACTS	72
8.2. EMERGENCY MANAGEMENT.....	72
8.2.1. RAILROAD EMERGENCY CONTACTS	72
APPENDIXES.....	I
X1. Example Theoretical Structure Cost Estimate for Railroad.....	II
X2. UDOT UPRR Master Agreement for At Grade Crossing Safety Improvement Projects...	III
X3. State Rail Plan Railroad Company Information and Location Maps	IV

ACRONYMNS AND ABBREVIATIONS

AAR:	Association of American Railroads
AASHTO:	American Association of State Highway and Transportation Officials
AADT:	Average Annual Daily Traffic
AREMA:	American Railway Engineering and Maintenance-of-Way Association
CFR:	Code of Federal Regulations
DB:	Design Build
EIC:	Employee in Charge
FHWA:	Federal Highway Administration
FRA:	Federal Railroad Administration
HASP:	Health and Safety Plan
MUTCD:	Manual on Uniform Traffic Control Devices
NHTSA:	National Highway Traffic Safety Administration
PDBS:	Project Development Business System
PDN:	Project Delivery Network
PM:	Project Manager
PPE:	Personal Protective Equipment
RE:	UDOT Resident Engineer
RFP:	Request for Proposal
ROW:	Right-of-Way
STIP:	State Transportation Improvement Program
UCOFN:	Utility Contract Overrun Funding Need
UCRY:	Utah Central Railway
UDOT:	Utah Department of Transportation
UPRR:	Union Pacific Railroad
USDOT:	United States Department of Transportation
UTA:	Utah Transit Authority
UTAH:	Utah Railway

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CHAPTER 1: INTRODUCTION

1.1. GENERAL

UDOT projects vary widely in scope, complexity and purpose, with each project having its own set of unique issues and circumstances. In most cases however, there are processes that when followed will guide the project team through successful execution and close out of a project. Projects involving Railroads are no different. This Manual of Instruction (MOI) is intended to provide UDOT staff with background information on Railroad processes and suggest steps for successfully navigating Railroad related issues. Projects involving Railroads are unique because of the relationship of the various parties, UDOT's oversight responsibilities for Highway-Rail Crossings (Crossings) and process requirements of the Railroads.



UDOT has jurisdiction over all Crossings in the state of Utah that are traversed by the public. This authority is codified in Utah State Code [Title 54-4-14](#), Establishment and regulation of grade Crossings and [Administrative Rule R930-5](#), Establishment and Regulation of At-Grade Railroad Crossings. Railroads, on the other hand, have jurisdiction over and are responsible for the safety of private

Crossings. UDOT's Crossing oversight goal is to improve the safety for all users and provide for the efficient operations of trains and vehicles and pedestrian access through Crossings. As part of this effort, UDOT promotes the elimination of Crossings, reviews all existing Crossings in the state for safety deficiencies, evaluates and approves the location of new Crossings,

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prescribes the type of improvements at Crossings and determines the maintenance responsibilities for Crossings.

Currently there are eight freight Railroads operating over 1,300 miles of track in the state of Utah. These freight Railroads carry over 20 million tons of freight on an annual basis.



Additionally, UTA currently operates 80 miles of rail service along the Wasatch Front carrying tens of thousands of daily passenger trips. UTA's rail service includes light rail transit, commuter rail and most recently, streetcar service. With the current and projected volumes of rail traffic, railroad coordination will continue to be an important aspect of many UDOT projects. Successfully identifying, coordinating, and managing a project with railroad related issues will be crucial to the success of projects statewide.

Project considerations from inception to close out:

- ***Identify critical path items and time-line completion requirements to minimize project delays and ensure a successful project delivery date.***
 - ***Establish best practices for all coordination, design and documentation activities on the project.***
 - ***Outline the roles and obligation of parties as defined in Utah State Code and define the roles and obligations of other UDOT personnel and stakeholders working on, or connected to a project.***
 - ***Outline federal, state and local laws, statues, roles and responsibilities.***
-

It is not the intent of this MOI to be all-inclusive. Where this MOI uses the terms “include” or “including,” the implied meaning is “including but not limited to.” As discussed above, every project has its own set of unique circumstances and issues, so it is important on Railroad related projects to consult with appropriate UDOT staff including the UDOT Chief Railroad Engineer, UDOT Region Utility and UDOT Railroad Leader, or UDOT Statewide Utility and Railroad Engineer at the earliest possible time in the project development phase to develop approaches to Railroad coordination issues.

1.2. MANUAL ORGANIZATION

Chapter 1: *Introduction*: introduces the Railroad Coordination Manual of Instruction. It describes the Manual's purpose, organization, and outlines Manual definitions and acronyms.

Chapter 2: *Laws, Regulations, Standards and References*: outlines federal, state, railroad and national association standards used or referenced in this Manual.

Chapter 3: *Railroad Coordination Process*: provides guidance for UDOT personnel for project development and documentation tasks.

Chapter 4: *Railroad Agreements*: describes the many types and components of railroad agreements.

Chapter 5: *Railroad Coordination During Construction*: outlines the roles and responsibilities associated with project construction oversight and documentation.

Chapter 6: *Project Billing and Closeout*: provides guidance to the invoicing, billing and payment aspects of a typical project; includes direction and information of final closeout of the project.

Chapter 7: *Utility Encroachments in Railroad Rights-of-Way*: outlines current Railroad policies and processes pertaining to utility encroachments.

Chapter 8: *Maintenance Coordination*: outlines the roles and responsibilities of the Highway Authority and the Railroad after the Crossing has been constructed.

Appendix: Includes examples and information.

1.3. ROLES AND RESPONSIBILITIES

This section describes the roles and responsibilities for the various parties involved in Railroad related Safety Improvement Projects and Highway Improvement Projects that have a Railroad component. The descriptions are meant to provide the general functions of the positions and do not include an exhaustive detail of all responsibilities.

Railroad Project Manager: This title varies by Railroad but for purposes of this manual this position is the point of contact for a specific Railroad.

UDOT Region Utility and Railroad Leader or Coordinator: UDOT Region Leader or Coordinator is responsible for coordinating with the Railroads and developing all utility and Railroad agreements necessary to successfully complete projects within their respective Regions, including overseeing the design and coordination efforts of consultants as defined in the most current version of the UDOT Project Delivery Network.

UDOT Statewide Utilities and Railroads Engineer: Manages the Utility and Railroad Coordination Program at the Central Project Development level; serves as the program resource for the Regions; serves as UDOT's Management Liaison with Railroad Companies; and facilitates the resolution of issues escalated from the project or region level.

UDOT Chief Railroad Engineer: This Traffic and Safety Division position is charged with regulating and promoting safety at all locations in the state where public roads cross Railroad tracks. This includes state highways, county roads, city streets, and all other public accesses across rail lines. More information is available on the UDOT [Railroad Safety](#) website.

UDOT State Safety Oversight Officer: This Traffic and Safety Division position provides Federal Transit Administration (FTA) required safety and security system oversight for Utah Transit Authority's (UTA) TRAX Light Rail Transit System through UDOT's State Safety Oversight Program Procedures and Standards. More information is available on the UDOT [State Safety Oversight](#) website.

UDOT Project Manager: This position oversees the delivery of the project from concept/environmental phases, through design phase, to completion of construction. The UDOT Project Manager provides continuity of project knowledge and history throughout all phases.

1.4. DEFINITIONS OF SELECTED TERMS USED IN THIS MANUAL

The section provides definitions used in the Manual of Instruction. The definitions are consistent with those used in the Utah State Administrative Rule [R930-5](#) that outlines UDOT's jurisdictional authority over Highway-Rail Grade Crossings.

[Administrative Rule R930-5](#) "The Rule" means the administrative rule that establishes and grants UDOT the authority to regulate Highway-Rail Grade Crossings.

Active Warning Devices: Those traffic control devices activated by the approach or presence of a train, such as flashing light signals, automatic gates and similar devices, as well as

manually operated devices and Crossing watchmen, all of which display to motorists positive warning of the approach or presence of a train.

Company: Any local district, utility or railroad company.

Diagnostic Review: The final order issued by the Chief Railroad Engineer outlining the improvements of a Crossing.

Diagnostic Team: A group comprised of the UDOT Chief Railroad Engineer, representatives from the railroads, representatives from local agencies including school districts, law enforcement agencies and others with interest in a Crossing who review, evaluate and make recommendations for proposed improvements or modifications to Crossings.

Highway: Any public road, street, alley, lane, court, place, viaduct, tunnel, bridge, or structure laid out or erected for public use, or dedicated or abandoned to the public, or made public in an action for the partition of real property, including the area within the ROW.

Highway Authority: UDOT or local agency that owns or has jurisdiction over a highway.

Highway Improvement Project: Projects on highways that cross railroad properties or involve adjustments to railroad facilities to accommodate highway construction that may or may not involve the elimination of hazards at a Crossing.

Highway-Rail Grade Crossing (Crossing): The general area where a Highway and a Railroad cross at the same level within which are included the rail line, Highway, and roadside facilities for public traffic traversing the area.

Neutral Quadrant: The quadrant that minimizes sight distance conflicts with immediate on-coming auto traffic. Generally, the neutral quadrant is on the far side of the tracks from the direction of vehicular travel.

New Crossing Application: The UDOT application a Highway Authority, Railroad or Company must submit when requesting a new Crossing.

Master Agreement: An agreement between a state highway agency on an area wide or statewide basis containing the specifications, regulations and provisions required in conjunction with work performed on all projects.

MOI: This UDOT Railroad Coordination Manual of Instruction

Passive Warning Devices: Those types of traffic control devices, including signs, markings and other devices, located at or in advance of grade Crossings to indicate the presence of a Crossing but which do not change aspect upon the approach or presence of a train.

Preliminary Engineering: The work necessary to produce construction plans, specifications, and estimates to the degree of completeness required for undertaking construction thereunder, including locating, surveying, designing, and related work.

Preliminary Engineering (PE) Letter: A letter issued by UDOT authorizing a Railroad to commence design on Railroad related improvements.

Preliminary Engineering Agreement: An Agreement to compensate a railroad company for preliminary engineering work performed on behalf of Projects when a Project requires a significant amount of operational analysis or engineering is speculative in nature, or at risk of cancellation or delay.

Railroad: All rail carriers, whether publicly or privately owned, and common carriers, including line haul freight and passenger Railroads, public transit districts, switching and terminal Railroads, passenger carrying Railroads such as rapid transit, and commuter and street Railroads.



Safety Improvement Project: A project that is developed through UDOT's Traffic and Safety Division for the specific purpose of eliminating hazards and improving the safe operation of trains, vehicles, and pedestrians through a Crossing, and is authorized and funded by United States Code, Title 23, Federal Safety Program funds.

USDOT#: A unique numerical identifier assigned to a Crossing by the Federal Railroad Administration that contains six digits followed by an alpha check character (example: 123-456X), it is sometimes referred to as DOT#.

1.5. CURRENT LIST OF ACTIVE RAILROADS IN THE STATE OF UTAH*

RAILROAD TYPE AND COMPANY	MILES OF OPERATED TRACK	UDOT REGION
Class I Railroads:		
Burlington Northern & Santa Fe Railway Company (BNSF)	433	2, 3
Union Pacific Railroad Company (UPRR)	1,249	1, 2, 3, 4
Regional Railroads:		
Utah Railway Company (UTAH)	396	2, 3,4
Switching and Terminal Railroads:		
Salt Lake City Southern Railroad (SL)	24	4
Savage Bingham & Garfield (SBG)	21	2
Utah Central Railway Company (UCRY)	34	1
Local Railroads:		
Salt Lake, Garfield & Western Railway (SLGW)	12	2
Heber Valley Railroad (HVRX)	16	3
Deseret Power Railway (DPRW)	17	3
Transit/Passenger Rail:		
National Railroad Passenger Corporation (Amtrak)	368	2,3,4
UTA TRAX Light Rail	45	2
UTA Frontrunner Commuter Rail (UFRC)	88	1, 2, 3
UTA Sugar House Streetcar	2	2

*Information based on [2014 Utah State Rail Plan](#)

More information and maps for railroad companies operating in Utah are included as Appendix **X3. Railroads in Utah, State Rail Plan Information**

CHAPTER 2: LAWS, REGULATIONS, STANDARDS, AND REFERENCES

2.1. FEDERAL LAWS, REGULATIONS, STANDARDS AND REFERENCES

[23 USC 130](#) "Railway-highway Crossings"

[23 USC 148](#) "Highway safety improvement program"

[23 CFR 140](#) "Reimbursement"

[23 CFR 635.410](#) "Buy America Requirements"

[23 CFR 646](#) "Railroads"

[23 CFR 655](#) "Traffic Operations"

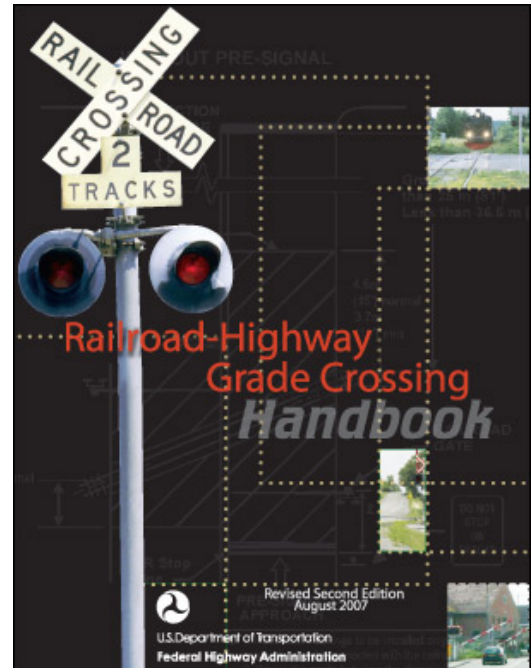
[49 CFR 659](#) "Rail Fixed Guideway Systems; State Safety Oversight"

[FHWA Railroad Highway Grade Crossing Handbook](#)

[Manual on Uniform Traffic Control Devices 2009 Edition](#)

[Federal Railroad Administration \(FRA\)](#)

[Federal Transit Administration \(FTA\)](#)



2.2. STATE LAWS, REGULATIONS, STANDARDS AND REFERENCES

2.2.1. CODES AND RULES

[Utah Code Title 10 Chapter 7 Part 5 Section 19](#) "Election to authorize"

[Utah Code Title 41 Chapter 6a Part 10 Section 1005](#) "Limitations on pedestrians related to railroad grade crossings or bridges"

[Utah Code Title 41 Chapter 6a Part 12](#) "Railroad Trains, Railroad Grade Crossings, and Safety Zones"

[Utah Code Title 54 Chapter 4 Section 14](#) "Safety regulation"

[Utah Code Title 54 Chapter 4 Section 15](#) "Establishment and regulation of grade crossings."

UDOT RAILROAD COORDINATION MANUAL OF INSTRUCTION

[Utah Code Title 63G Chapter 3](#) “The Utah Administrative Rulemaking Act”

[Utah Code Title 72 Chapter 1 Part 2 Section 201](#) “Creation of Department of Transportation – Functions, powers, duties, rights, and responsibilities.”

[Utah Administrative Rule R930-5](#) “Establishment and Regulation of At-Grade Railroad Crossings”

2.2.2. UDOT STANDARD DRAWINGS, DOCUMENTS AND SPECIFICATIONS

[Utah Manual on Uniform Traffic Control Devices \(MUTCD\)](#)

[2012 UDOT Standard and Supplemental Specifications](#)

[2012 UDOT Standard and Supplemental Drawings](#)

[Standard Drawing ST 7 Pavement Marking and Signs at Railroad Crossings](#)

[UDOT Pedestrian Grade Crossing Manual](#)

[Supplemental Drawing GW 12A1 Active Pedestrian Controls for Railroad Crossings Sheet 1 of 2](#)

[Supplemental Drawing GW 12A2 Active Pedestrian Controls for Railroad Crossings Sheet 2 of 2](#)

[Supplemental Drawing GW 12B1 Passive Pedestrian Controls for Railroad Crossings Sheet 1 of 2](#)

[Supplemental Drawing GW 12B2 Passive Pedestrian Controls for Railroad Crossings Sheet 2 of 2](#)

[Supplemental Drawing GW 12C1 Pedestrian Controls Semi-Exclusive Railroad Alignments Sheet 1 of 2](#)

[Supplemental Drawing GW 12C2 Pedestrian Controls Semi-Exclusive Railroad Alignments Sheet 2 of 2](#)

[Supplemental Drawing GW 12D Pedestrian Controls Street Running Railroad Alignment Signalized Intersections](#)

[Supplemental Drawing GW 12E Pedestrian Controls Street Running Railroad Alignment Unsignalized Intersections](#)

[UDOT New Crossing Application](#)

[UDOT Policy 08B-29, “Accomplishment of and Payment for Utility Relocations Required in Connection with Highway Work” \(Including Railroad Relocation\)](#)

[UDOT Policy 08E-01 Railroad Participation and Maintenance Responsibilities for Railroad-Highway Project Agreements](#)

[UDOT Policy 08E-04 Coordination and Execution of Agreements with Railroad Companies Required on UDOT and Railroad Projects](#)

2.3. RAILROAD STANDARDS AND REFERENCES

GCOR [General Code of Operating Rules](#)

UPRR-BNSF [Guidelines for Grade Separation Projects](#)

UPRR [Guidelines for Temporary Shoring](#)

UPRR [Structure Demolition Guidelines](#)

UPRR [Active Warning Devices](#) – Flashing Lights with Gates, Signal Preemption Projects

UPRR [At-Grade Roadway \(Crossing\) Improvement Projects](#)

UPRR [Road Crossing Checklist](#)

UPRR [Nonintrusive Civil Engineering Survey Permit](#)

UPRR [Bridge Painting Guidelines](#)

UPRR [Parallel Roads/Highways Guidelines](#)

UPRR [Industrial Track Specifications](#)

UPRR [Construction Requirements](#)

UPRR [Interim Guidelines for Horizontal Directional Drilling under UPRR Right-of-Way](#)

UPRR [Right of Entry/Temporary Use of Railroad Property](#)

UTA [Design Information](#)

UTA [Licensing, Right of Entry, Access TRAX, Access FrontRunner, Roadway Worker Training, Insurance Requirements, Other Documents](#)

2.4. NATIONAL ASSOCIATION STANDARDS AND REFERENCES

[A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials](#) (AASHTO) (2011)

[ITE Grade Crossing Materials](#), Institute of Traffic Engineers (ITE)

Manual for Railway Engineering, Communications and Signals Manual, [American Railway Engineering and Maintenance-of-Way Association](#) (AREMA)

2.5. HORIZONTAL AND VERTICAL CLEARANCES

The clearances noted in this section are general clearances provided for informational purposes only. When developing design details, additional review should be given to the appropriate federal, state, Railroad and industry standards to ensure proper clearances are maintained.

Clearances should be reviewed by project designers and project managers during the plan sheet development stages. They should be reviewed for overall geometry, active warning device placement, signing, striping, and overall conformance to standards.

The UDOT Project Manager should review all offsets and clearances of plans during plan review periods. The UDOT Chief Railroad Engineer should also review plans during plan review periods to ensure all clearances, offsets and control systems have been accounted for and achieved.

The order of precedence for the design and review of Crossings is as shown here:

Order of Precedence for Highway-Rail Crossing Design Standards		
Rank	Traffic Control Systems	Track/Crossing Design
1	MUTCD	FHWA
2	UDOT	AASHTO
3	RR Standards	AREMA
4		RR Standards

2.5.1. AREMA CLEARANCES

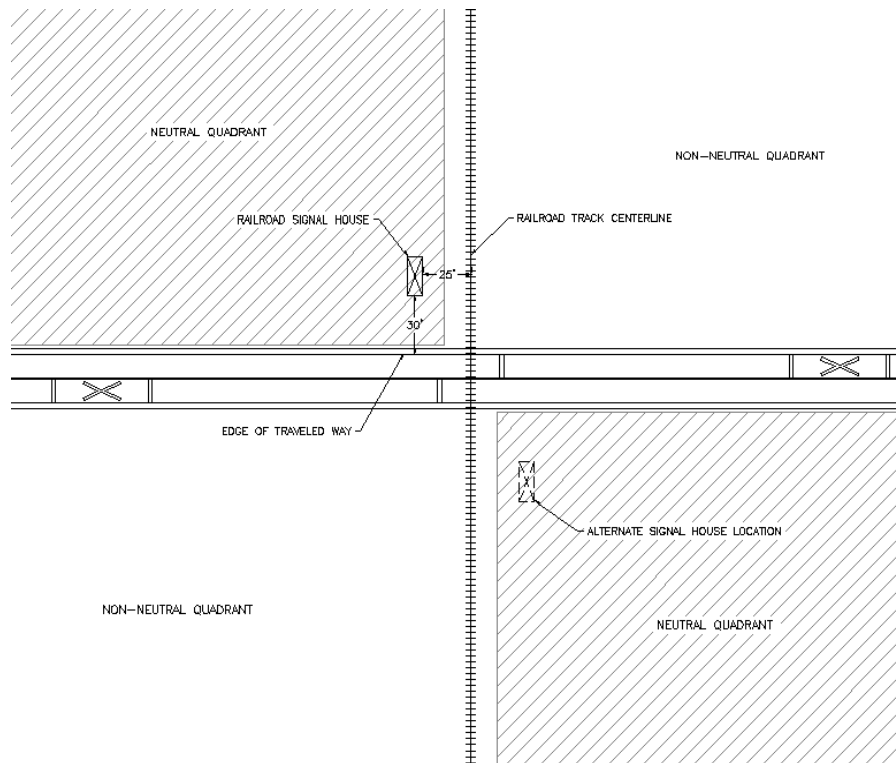
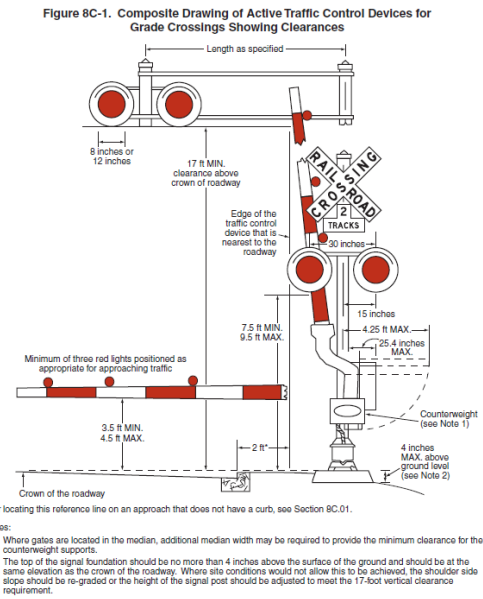
AREMA Clearances for the State of Utah				
Regulation Reference: G.O. 66 08-31-53				
Track Centers	Main Tracks		14'-0"	
	Any Two Subsidiary Tracks		14'-0"	
	Adjacent Subsidiary Track to Any Main Track		15'-0"	
	Ladder Track Adjacent to Any Parallel Track		17'-0"	
	Two Adjacent Parallel Ladder Tracks		18'-0"	
	Lead, Repair and Caboose Tracks		14'-0"	
	Team Tracks in Pairs		11'-6"	
	Unloading Tracks at Platforms		11'-6"	
Vertical	General		22'-6"	
	Thru Bridges		22'-6"	
	Highway Bridges		23'-0"	
	Tunnels		22'-6"	
	Building Doors		18'-0"	
	In Buildings		18'-0"	
Horizontal	General		8'-6"	
	Thru Bridges		8'-0"	
	Highway Bridges		8'-6"	
	Tunnels		8'-0"	
	Building Doors		8'-6"	
	In Buildings		8'-6"	
	Platforms	A		0'-8"
		B		4'-8"
		C		1'-9"
		D		5'-8"
		E		4'-0"
		F		7'-3"
	Signals	Low, Betwe en Tracks	High	8'-6"
			Height	3'-0"
	Switch Boxes, Etc.	Clearance	Height	6'-0"
			Clearance	0'-4"
			Poles	8'-6"
			Mail Cranes	E
Icing Docks			7'-8"	
Ore and Coal Docks			8'-6"	
Cattle Chutes			8'-6"	
Pipelines			22'-6"	

2.5.2. MUTCD CLEARANCES

The MUTCD provides clearances for traffic control systems at highway-rail Crossings. The systems identified within the MUTCD include signs, pavement markings, and signals. Refer to Part 8 of the [Utah MUTCD](#) for further guidance on Crossing traffic control system type and placement.

2.5.3. UDOT CLEARANCES

The UDOT [Standard Drawing ST 7](#) provides guidance on the placement of highway-rail Crossing signage and pavement markings and should be the basis for all traffic control systems for all Crossings in the state of Utah. For items not identified by ST 7, reference should be given to the other design standards noted in this section. Below is a sketch of the adopted UDOT Signal House Placement from the MUTCD:



Neutral Quadrant locations as shown are the locations in which the Railroad signal houses or “bungalow’s” and facilities are to be placed in order to ensure driver sight distance of the rail corridor is not impaired.

2.5.4. FHWA CROSSING SIGHT DISTANCES

The proximity of obstructions to a Crossing is of great concern and importance to the overall safety of a Crossing. The ability of the driver to see an approaching train shall not be obstructed. Refer to the [FHWA Railroad-Highway Grade Crossing Handbook](#) for sight distance requirements and guidance.

CHAPTER 3:

CROSSING PROJECT COORDINATION PROCESS

3.1. TYPES OF CROSSING PROJECTS

Federal and State Regulations categorize projects into two general types; Highway Improvement Projects and Crossing Safety Improvement Projects. Rail Transit Projects may be encountered when UTA is constructing new facilities on their system.

3.1.1. HIGHWAY IMPROVEMENT PROJECTS

Highway improvement projects are identified and selected as part of UDOT's planning, programming, STIP evaluation and project approval process.

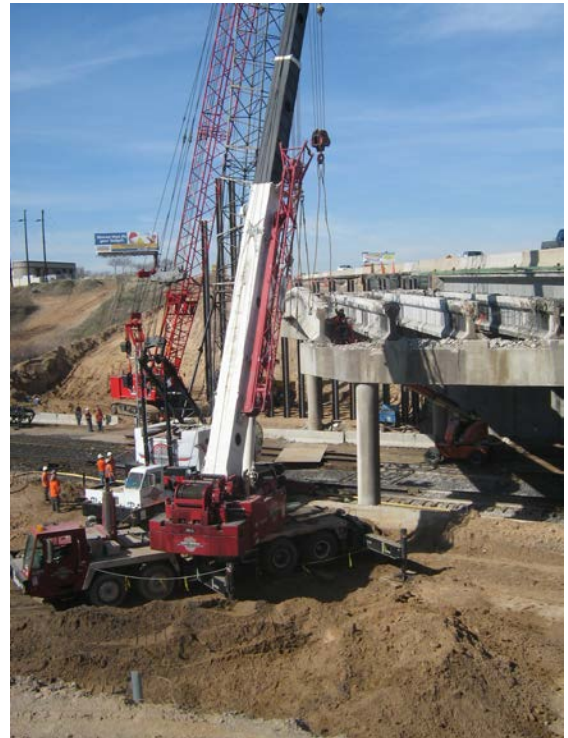
Highway Improvement Projects include, but are not limited to:

- Projects that use Railroad properties or involve adjustments to Railroad facilities required by Highway construction, but do not involve the elimination of hazards at a Crossing.
- Construction of a new Crossing at or over a Railroad track where the new Highway is not a relocation of an existing Highway.

3.1.1.1. GRADE SEPARATION PROJECTS

Grade Separation Projects include, but are not limited to:

- Construction of new highways requiring new grade separation structures.
- Construction of new grade separation structures that eliminate existing Crossings.
- Reconstruction of existing grade separation structures.



3.1.1.2. DESIGN BUILD PROJECTS

Design Build (DB) projects present a unique set of complexities given the number of, and differing responsibility of the parties involved. The DB team is responsible for design of grade separation structures or grade crossing installations or reconstructions. UDOT should initiate early coordination efforts with the Railroad, well in advance of the RFP being prepared and before the DB Contractor is selected. The Project Manager, through the Region Utility and Railroad Leader, should request a Diagnostic Review of the impacted Crossings, and the recommendations of the review should be incorporated into the RFP as contract requirements. For grade separation structure construction or reconstruction, UDOT should discuss track configuration, future track requirements, off track maintenance access and other issues that will dictate the span of the structure prior to the issuance of the RFP. Temporary Crossings and any other required Railroad work that can be identified early on should be discussed and commenced as early as possible in the RFP Phase so they don't delay projects. Effective communication is needed between the UDOT Project Manager, Project or Region Utility and Railroad Leader, Railroads and the DB Team. Timely completion and review of structure and Crossing designs, and the early execution of the Railroad agreements will ensure the DB project remains on schedule.

3.1.1.3. LOCAL AGENCY PROJECTS

Because Local Agency Projects are Federal Aid funded, agreements for reimbursable railroad work must meet federal requirements. Railroad companies must be informed that Buy America requirements apply to the project during the planning stages, and Buy America provisions must be included in agreements. The Local Agency must follow the UDOT standard agreement format including signatures by UDOT, the Local Agency and the Railroad.

3.1.2. CROSSING SAFETY IMPROVEMENT PROJECTS

Crossing Safety Improvement Projects are identified and delivered by UDOT's Traffic and Safety Division in cooperation with local agencies and Railroads.

Crossing Safety Improvement Projects include, but are not limited to:

- Elimination of a Crossing by combining multiple Crossings.
- Elimination of a Crossing by the relocation of a highway.
- Elimination of a Crossing by the construction of a new grade separation.
- New safety improvements.
- Reconstruction of a Crossing grade separation structure.

- Repair of a Crossing material that would otherwise be the responsibility of the Railroad as prescribed in the R930-5, if the repair of the Crossing material affects or is an integral part of the Crossing safety devices.

UDOT has established a process for the evaluation and selection of Crossing Safety Improvement Projects that considers the potential reduction in the number and/or severity of collisions, the cost of the Crossing projects, and available resources. Specific methods for selecting and prioritizing Crossing for improvements include:

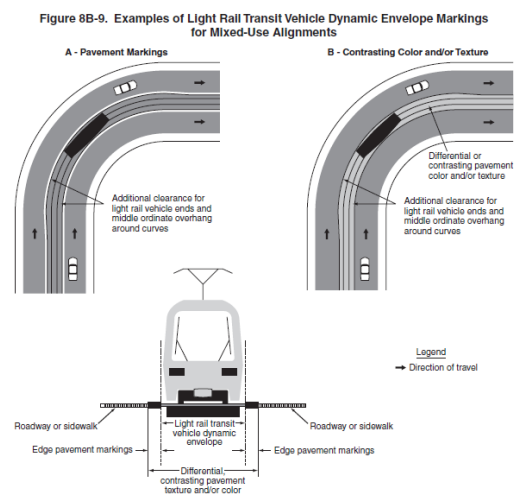
- The collection and maintenance of data utilizing the USDOT Grade Crossing Inventory to record Crossing data including, but not limited to the current physical condition, average daily traffic, and collision data associated with a Crossing.
- An engineering study conducted on a Crossing at the request of a Highway Authority, Railroad, or company or using a priority list developed using the USDOT Accident Prediction Model. The purpose of the engineering study is to review the Crossing and its environment, identify the nature of any deficiencies and recommend alternative improvements. Specifically, an engineering study reviews Crossing characteristics, the existing traffic control system, and the highway and Railroad characteristics. Based on the review of these conditions, an assessment of the existing and potential hazards is made, deficiencies are identified and countermeasures are recommended.

System or corridor evaluations consider a Crossing as a component of a larger transportation system. The objective is to improve both safety and operations of the total system or segments of the system. In such cases, all Crossings within a corridor are evaluated and can be programmed for improvements. The optimal outcome of a corridor study involves a combination of engineering improvements and closures such that both safety and operations are highly improved.

3.1.3. RAIL TRANSIT PROJECTS

UTA delivered Rail Transit Projects include, but are not limited to:

- The Coordination required to facilitate the design and construction of Light Rail, Streetcar and Commuter Rail facilities within or Crossing state highways, either at-grade or grade separated.



3.2. GENERAL RAILROAD COORDINATION INFORMATION

[Administrative Rule R930-5](#) describes the procedures for evaluating and selecting a Crossing for safety improvement; evaluating and selecting the type of improvements or adjustments at a Crossing, including passive and active warning devices; and for evaluating and determining whether a Crossing should be grade separated. The Rule also outlines the roles and responsibilities of the various parties with respect to the design, maintenance and funding of Crossing improvements and impacts.

In the sections that follow, the critical components and processes established in the Rule have been incorporated to provide a quick reference for the UDOT Project Manager or designee. It is recommended that all parties review and understand the Rule.

3.2.1. DIAGNOSTIC TEAM

A critical component of the Railroad coordination process is the Diagnostic Team, which is led by the UDOT Chief Railroad Engineer. The UDOT Project Manager, through the Region Utility and Railroad Leader, should contact the UDOT Chief Railroad Engineer at the earliest possible time to schedule a Diagnostic Team review if their Highway Improvement Project affects a Crossing.

The role of the Diagnostic Team is to make recommendations to UDOT for required safety improvements at existing and proposed Crossings and to evaluate, make recommendations and approve the design of modifications to existing Crossing facilities necessitated by highway construction projects.

The Diagnostic Team is usually composed of the following team members:

- UDOT Chief Railroad Engineer
- Representative from the Railroad
- Representative from the appropriate Private Company, if applicable
- Representative from the Local Highway Authority (preferably from engineering or public works), as applicable on Local Agency Projects, and where appropriate, representatives of the public school district, law enforcement agency and others with an interest in the Crossing
- The Region Utility and Railroad Leader and the Project Design Team for Highway Improvement Projects

Specific responsibilities of the Diagnostic Team include:

- Recommend the elimination of a Crossing
- Recommend the type of safety improvements including, but not limited to passive and active warning devices, the type of Crossing material, improvements to Highway approaches, removal of foliage and brush, pedestrian facilities (including compliance with ADA requirements), and improvements to street lighting
- Review all requests for a new Crossing
- Review all requests to reclassify a Crossing from private to public
- Recommend that UDOT conduct an engineering study to evaluate the need for a new overpass or other grade separation structure(s)
- Recommend any other safety related changes to improve vehicle and pedestrian safety

Design restrictions for modified Crossings and adjacent accesses:

- ***No new access openings can be opened within 250' of a Crossing unless approved by the UDOT Chief Railroad Engineer.***
 - ***Prior to approving new residential, commercial, or industrial development within 1000 feet of a Crossing, the Highway Authority shall request a Diagnostic Team review to assess the potential traffic impacts at the Crossing.***
 - ***Before a Highway Authority approves increased development that changes the conditions of a Crossing by significantly increasing traffic volumes, the Highway Authority plans shall be approved by the Chief Railroad Engineer.***
-

3.2.2. NEW CROSSINGS

UDOT supports FRA’s Risk Reduction Program to improve the safety of the nation’s rail network and acknowledges that reducing the number of Crossings is an important component of that effort. It is unrealistic however, to expect there will not be a demonstrable need for a new Crossing in certain circumstances. With the goal of reducing the number of Crossings under the FRA Risk Reduction Program, UDOT’s initial requirement for any request to open a new Crossing will be to close two Crossings within the same jurisdiction. If it is determined by UDOT that two other Crossings cannot be closed, significant safety improvements must be made to other Crossings on the corridor to show an overall safety improvement.

When a Highway Authority widens or constructs a new Highway, the Highway Authority shall be responsible to request a Diagnostic Team review of the Crossing and arrange by agreement with the Railroad to design and install all required improvements concurrent with its request for approval from UDOT.

A completed copy of the [New Crossing Application](#) form published by UDOT shall also be submitted to the UDOT Chief Railroad Engineer by the Highway Authority or Railroad making the request prior to the Diagnostic Team review. The following information must be submitted as part of a New Crossing Application:

- A Highway Authority or Railroad, making a request for a new Crossing or the reclassification of a Crossing from private to public shall provide UDOT with an approved master street plan from the appropriate jurisdiction showing the elimination or combination of existing Crossings and/or other safety improvements that enhance the overall safety of the corridor before a new Crossing or reclassification of a Crossing from private to public will be approved.

Railroad Crossing Application Utah Department of Transportation		
Current average daily road traffic: _____	Operating railroads at this crossing: _____	Application Date: _____
Current average rail traffic: _____	Owning railroad: _____	If existing crossing, give DOT number: _____
Approximate Street Address & City: _____	Applicant: _____ Name: _____ Address: _____ Phone #: _____	
Approximate Railroad Milepost and Subdivision: _____		
Reason for request: _____ _____ _____ _____		
Note that UDOT may require additional information as the crossing application is reviewed and processed.		
Attach the following information 1. Copy of master plan from city, clearly showing the proposed crossing 2. Proposed crossings to be closed 3. Engineering drawing (8.5x11 or 11x17) of proposed crossing must include: • Street adjacent street • Other access within 250 ft • Sight obstructions (buildings, trees, etc.) • Number of lanes and number of tracks • Smallest angle between centerline of track, centerline of road • UDOT number, railroad milepost, railroad subdivision		Submit application to: Utah Department of Transportation Office of Railroad Safety 4501 South 2700 West Salt Lake City, UT 84114-8445 Office: 801-965-4176 Fax: 801-965-4564
INTERNAL UDOT USE ONLY		
Received: _____	Diagnostic/Surveillance Date: _____ DM# _____ Private/Public Conversion? _____ Yes No	Application Status: Denied: _____ Authorized: _____ DM# _____
NOIA Date: _____, DM# _____	PE Auth to RR: _____, DM# _____	PSC Appeal Date: _____, DM# _____
NTP for Const.: _____, DM# _____		PSC Ruling Date: _____, DM# _____

- A Highway Authority or Railroad requesting a new Crossing or reclassification of a Crossing from private to public will mutually arrange by agreement for the proposed new Crossing or reclassification of a Crossing before the UDOT Chief Railroad Engineer will approve of the change.

3.2.3. GENERAL UTILITY GRADE CROSSING ENCROACHMENT PROCEDURES

In the state of Utah, UTA and Union Pacific Railroad are identified with the largest majority of Railroad utility encroachments. Each Railroad has specific processes, procedures and regulations for obtaining encroachment licenses and/or permits. [CHAPTER 7: Utility Encroachments in Railroad Rights-of-Way](#), provides the information necessary to identify varying types of encroachments, and each Railroad's policies and procedures.

3.2.4. CROSSING CLOSURES

Crossings can be closed for several reasons including Crossing consolidations and for safety reasons. UDOT has the authority to temporarily close a Crossing if the UDOT Chief Railroad Engineer makes a determination that the Crossing poses an undue risk to the public. As mentioned above, UDOT supports the closing of Crossings. UDOT also recognizes that permanently closing a Crossing can have a significant impact on surrounding communities by altering traffic patterns. So any decision to permanently close a Crossing will involve an analysis of the impacts to be conducted by the requesting Local Highway Authority or Railroad and a public outreach effort that is overseen by UDOT, see 3.2.7 for further details. As with all actions affecting a Crossing, closures shall also be reviewed by a Diagnostic Team.

3.2.5. FUNDING AUTHORIZATION AND APPORTIONMENT OF COSTS

FHWA approved Safety Improvement Projects are eligible for federal safety funding. As stated previously, if a Region is interested in determining the eligibility of its project for safety funding, please contact the UDOT Chief Railroad Engineer at the earliest possible time. Below is a list of criteria for determining funding eligibility and apportionment of costs:

- Generally, costs must be associated with a FHWA authorized and approved Safety Improvement program to be eligible for federal participation. Eligible costs incurred in an approved program prior to authorization by FHWA are not reimbursable, but may be included as part of the Railroad's share of the project cost where such a share is required. Eligible costs include, but are not limited to cost associated with environmental clearance, preliminary engineering, and ROW acquisition.
- Apportionment of costs for installation, maintenance, and reconstruction of safety related improvements at a Crossing shall be in accordance with [23 CFR 646](#) and [Utah Code Section 54-4-15](#).
- When a Highway Authority widens a Highway, the Highway Authority will fund all improvements including, but not limited to passive and active warning devices, Crossing material, and other improvements as ordered by the UDOT Chief Railroad Engineer in consultation with the Diagnostic Team.

UDOT will evaluate each Crossing project to determine the extent to which, if any, the Crossing projects benefits the respective parties. If a Crossing project is determined not to benefit a party, the party will not be required to participate in the funding.

3.2.6. PUBLIC NOTICE

Certain Crossing improvements and actions require a public notice and opportunity for a public hearing. These improvements and actions include:

- When UDOT is considering a proposal to close a Crossing, add a track at a Crossing, or construct a new Crossing, it is the responsibility of the Highway Authority or Railroad requesting the proposed action, in consultation with the UDOT Chief Railroad Engineer, to carry out the requirements of this section unless otherwise agreed to by the UDOT.

In instances where the action proposed by the UDOT does not substantially affect the public, UDOT may waive the requirement to notice a public hearing opportunity, provided the affected Diagnostic Team members concur in writing.

3.2.7. RAILROAD CROSSING INVENTORY

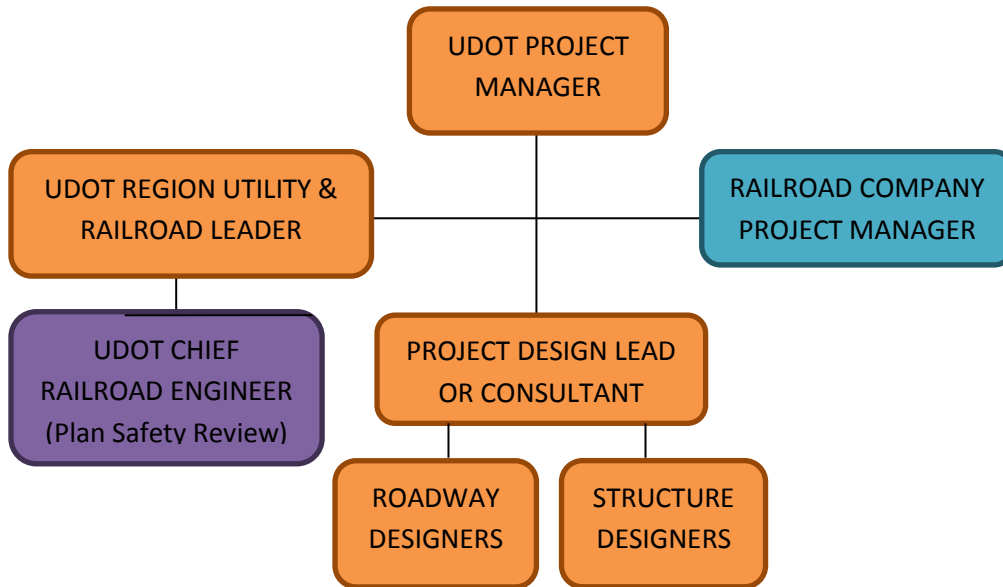
The Federal Railroad Administration currently oversees the management of the USDOT Crossing inventory. The inventory consists of all Crossings in the nation, private and public, both at-grade and grade separated. Each Crossing is assigned a USDOT#. Each USDOT# is unique to every Crossing with no two being the same. For each Crossing a USDOT Crossing inventory form is maintained. The inventory form identifies location of the Crossing, operating Railroad(s), physical characteristics, train movement information, Crossing protection and highway information. Each state is responsible to maintain all Crossing inventories which involve inspection, documentation, and updating the national database on an annual basis. Railroads contribute selected information for the inventory and may directly submit to the FRA. FRA acts solely as the “maintainer” of inventories.



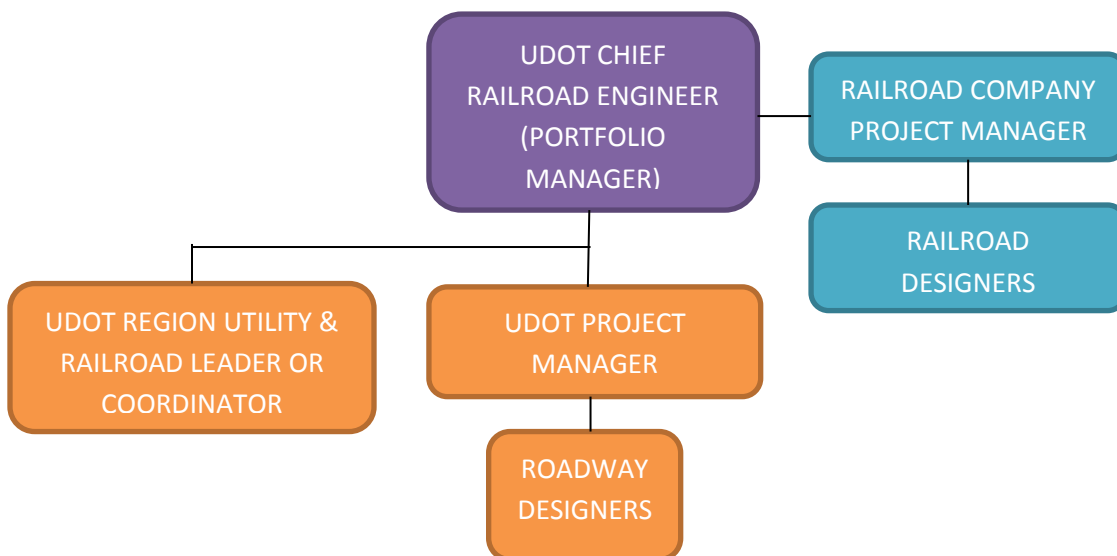
3.3. PROJECT STAFF ORGANIZATION

Highway improvement projects are initiated and delivered by Region staff with support from the Project Development Group and the Traffic and Safety Division. Safety Improvement projects are initiated and delivered through the Traffic and Safety Division with support from Region staff and the Project Development Group.

3.3.1. HIGHWAY IMPROVEMENT PROJECTS



3.3.2. SAFETY IMPROVEMENT PROJECTS



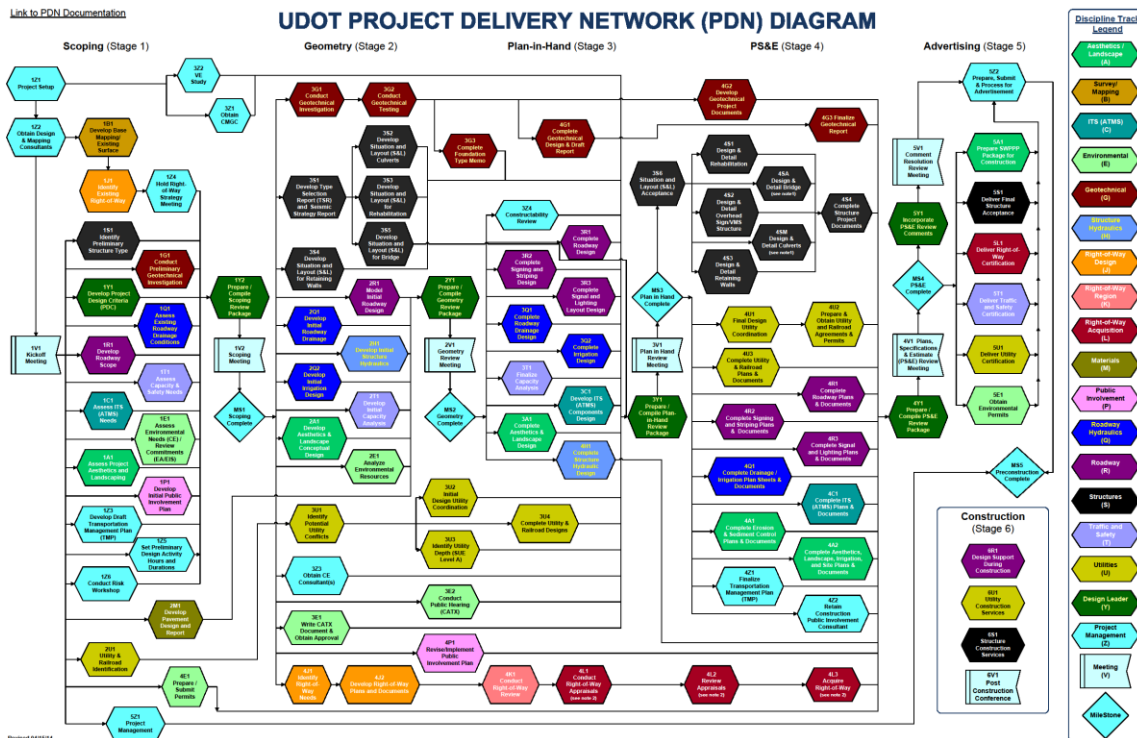
3.4. UDOT PROJECT DELIVERY NETWORK

When a highway project involves railroad facilities, tasks that require railroad coordination are found in the Utility, Right of Way and Structure Discipline Tracks of the Project Delivery Network (PDN). Major tasks that involve coordination with railroad companies are listed below with a flowchart and brief narrative (if applicable) regarding the timing of the tasks, nuanced aspects of tasks and critical items that must be accomplished to maintain overall project timelines. **Refer to the full version of the PDN for task descriptions, deliverables and responsible parties to ensure all requirements are accounted for and addressed.**

Best Practice No. 1 Coordinate Early

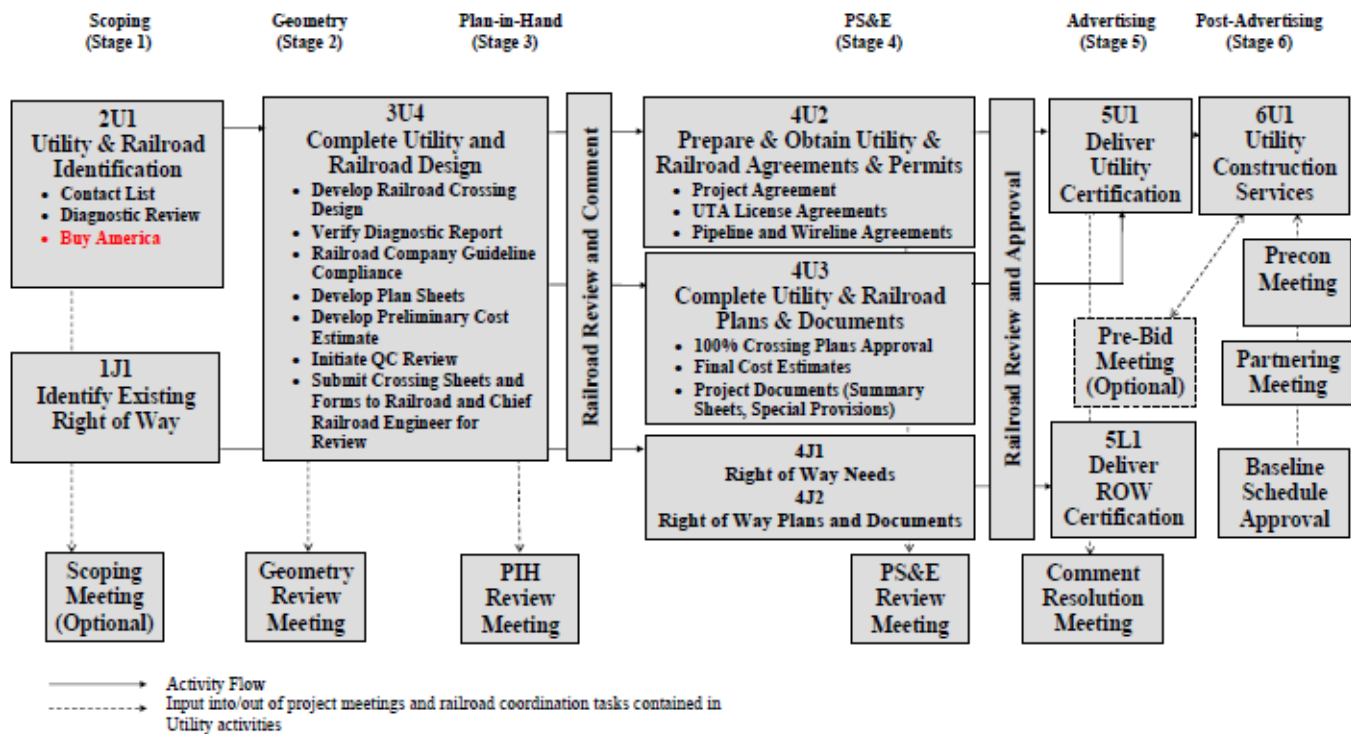
“Railroad personnel repeatedly told of initial coordination occurring at the 30 percent plan-development stage, which sometimes was far too late”

SHRP 2 Report S2-R16-RR-1



3.4.1. Utility Discipline Track, At Grade Railroad Crossings

PROJECT DELIVERY NETWORK
RAILROAD COORDINATION TASK FLOW CHART – AT GRADE CROSSINGS



“When a Highway Authority widens or constructs a new Highway, the Highway Authority shall be responsible to request a Diagnostic Team review of the Crossing and arrange by agreement with the Railroad to design and install all required improvements concurrent with its request for approval from the Department”

Utah Administrative Rule R930-5-7

2U1 Utility and Railroad Identification

- Contact List
- Diagnostic Review

The Region Utility and Railroad Leader is responsible to contact the Chief Railroad Engineer to request a Diagnostic Review of at-grade railroad Crossings impacted by highway improvement projects. The Diagnostic Review Report lists the Review Team members, provides background information about the Crossing, and gives general and site specific recommendations dictating the features and improvements required at a Crossing. Design cannot begin on the Crossing improvements or adjustments until the UDOT Chief Railroad Engineer has issued a final order outlining the improvements, so it is mandatory to request this review at the earliest possible time in the project delivery process.

Diagnostic Reviews should also be conducted on projects that do not directly impact a Crossing but will alter its current use or safety, i.e. commercial and residential development, roadway geometry, traffic patterns and/or access proximity.

- Concurrent Task:
1J1 – Identify Existing Right of Way

3U4 Complete Utility and Railroad Designs

The Railroad Crossing Designer is responsible to develop the at-grade Crossing design and plan sheets. The Region Utility and Railroad Coordinator submits the plans and forms to the Railroad Company for review.

- Develop At Grade Crossing Design
- Prepare At Grade Crossing Plan Sheets
- Develop At Grade Crossing Cost Estimate

UDOT RAILROAD COORDINATION MANUAL OF INSTRUCTION

Pedestrian Facilities for Railroad Crossings



The expansion of light rail transit and commuter rail systems has resulted in increased pedestrian exposure to rail activity. UDOT has developed the Pedestrian Grade Crossing Manual and Supplemental Drawing GW Series for use in the planning and design of pedestrian facilities for railroad crossings impacted during the development of highway projects.

At Grade Crossing Design References

[FHWA Railroad Highway Grade Crossing Handbook](#)

[Manual on Uniform Traffic Control Devices 2009 Edition](#)

[Utah Manual on Uniform Traffic Control Devices \(MUTCD\)](#)

[Standard Drawing ST 7 Pavement Marking and Signs at Railroad Crossings](#)

UPRR [Active Warning Devices](#) – Flashing Lights with Gates, Signal Preemption Projects

UPRR [At-Grade Roadway \(Crossing\) Improvement Projects](#)

UPRR [Road Crossing Checklist](#)

UPRR [Industrial Track Specifications](#)

UPRR [Interim Guidelines for Horizontal Directional Drilling under UPRR Right-of-Way](#)

UTA [Design Information](#)

[ITE Grade Crossing Materials](#), Institute of Traffic Engineers (ITE)

Manual for Railway Engineering, Communications and Signals Manual, [American Railway Engineering and Maintenance-of-Way Association](#) (AREMA)

- Submit Railroad Crossing Sheets and Forms for Railroad Company Review

Best Practice No. 3 Anticipate Time Frames for Review

“The need for coordinated, fully considered comments requires time from the railroads. The Structures Department, the Operations Unit, the Construction Department, the Signal and Communication Division and the Real Estate or Legal Department routinely all need to coordinate their comments on a project.”

SHRP 2 Report S2-R16-RR-1

4U2 Prepare and Obtain Utility and Railroad Agreements and Permits

The Region Utility and Railroad Leader is responsible to prepare or oversee the preparation of agreements and licenses for construction and utility installations on railroad property including compiling the approved plans and right of way documents from team members and cost estimates from railroad companies.

- Complete Railroad Construction and Maintenance Agreement
- Prepare Wireline, Pipeline and Encroachment Permits for Utilities in Railroad ROW
- Concurrent Task:

4J1 – Identify Right of Way Needs

Best Practice No. 2 Use Standard Designs and Legal Agreements

“Many state DOTs and railroad companies have negotiated standard legal agreements and standard designs. Use them, advise the railroads.”

SHRP 2 Report S2-R16-RR-1

4U3 Complete Utility and Railroad Plans and Documents

The Utility Designer completes the plans, cost estimates and necessary Special Provisions with assistance from the Region Utility and Railroad Engineer.

- Complete At Grade Railroad Crossing Improvements Design
- Complete At Grade Railroad Crossing Improvements Plan Sheets
- Finalize Utility Relocation/At Grade Crossing Cost Estimate
- Enter Utility Relocation/At Grade Crossing Cost Estimate into PDBS
- Develop Utility Relocation/At Grade Crossing Project Documents
- Concurrent Task:

4J2 – Prepare Right of Way Plans and Documents

5U1 Deliver Utility Certification

- Concurrent Task:
5L1 – Deliver Right of Way Certification

UDOT RAILROAD COORDINATION MANUAL OF INSTRUCTION

Railroad Coordination Responsibilities for At Grade Crossing Projects

Region Utility and Railroad Leader

- Facilitate and oversee coordination within the team
- Request Diagnostic Review of crossing through Chief Railroad Engineer
- Ensure compliance with AREMA, MUTCD and railroad requirements
- Review and transmit formal submittals
- Track submittals, review durations, comment resolution and approval
- Prepare Agreements for Statewide Utility and Railroad Engineer and Legal Review
- Compile attachments (approved plans, cost estimates. ROW documents)
- Provide Special Provisions
- Fund , execute and distribute agreements

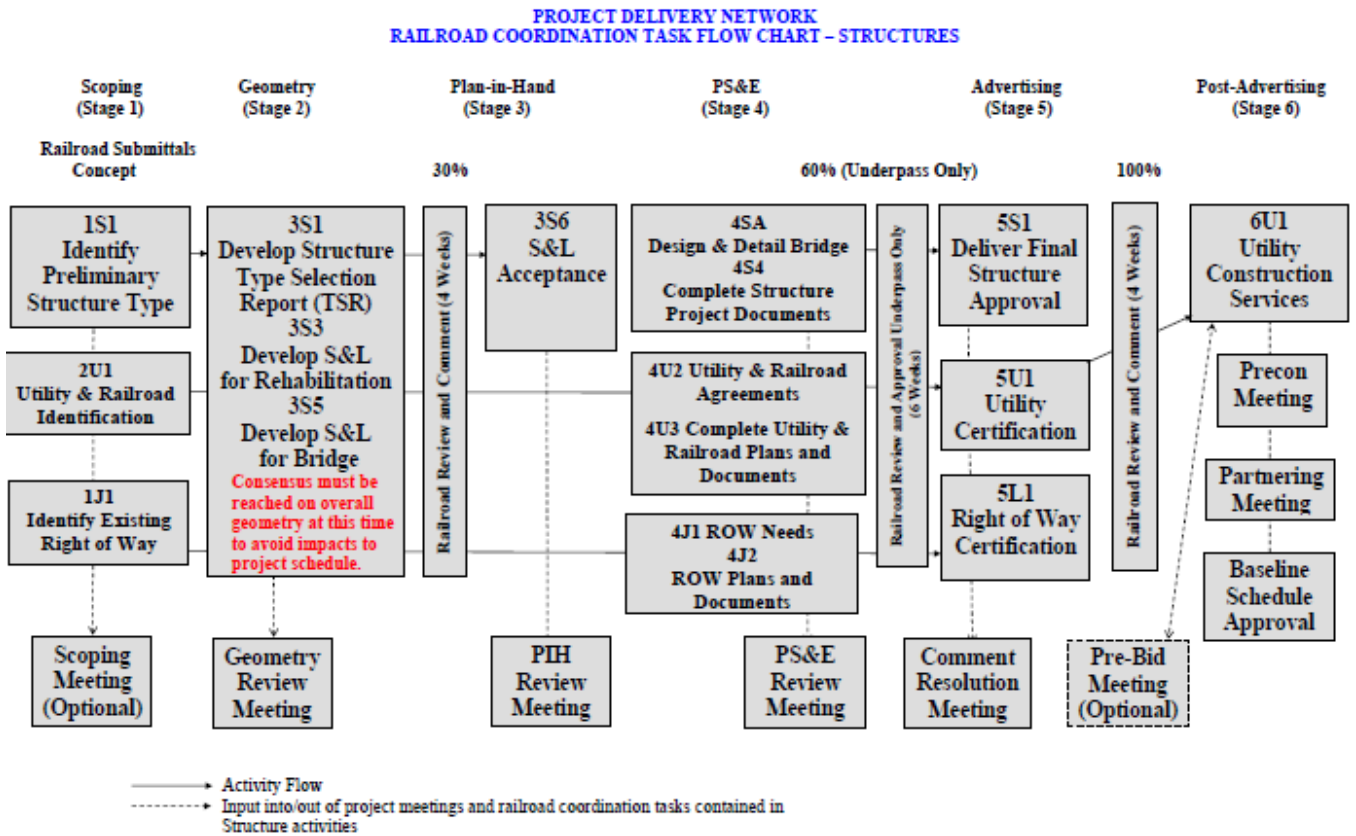
Roadway Designer

- Design crossing in compliance with Diagnostic Review Report and all applicable AREMA, MUTCD and railroad company specifications and requirements.
- Address pedestrian and preemption requirements as required
- Identify all existing and proposed utility pipeline and wireline installations in railroad right of way.
- Prepare and provide submittal packages to Utility and Railroad Leader
- Address railroad company comments

Right of Way Lead

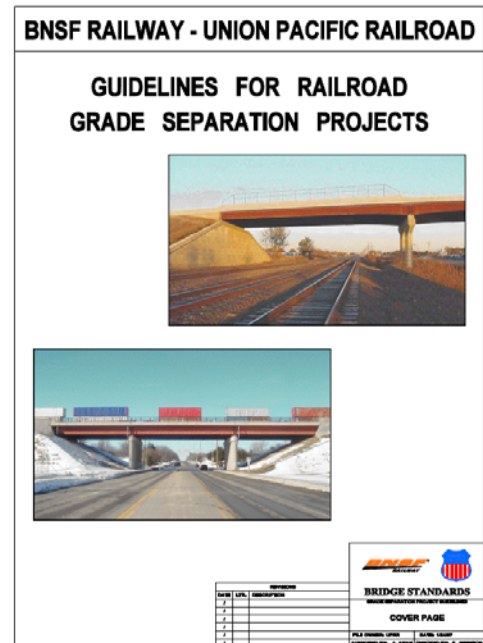
- Identify existing Railroad Right of Way
- Identify existing highway property rights
- Determine property rights required by project
- Prepare and provide ROW plans and legal descriptions to Utility and Railroad Leader
- Prepare and record ROW Instruments

3.4.2. Structures Discipline Track, Grade Separation Structures



Designs and submittals for structures over or carrying UPRR tracks must follow the requirements of the [BNSF Railway-Union Pacific Railroad Guidelines for Railroad Grade Separation Projects](#)

Typically, UTA and other railroads follow UPRR Guidelines and defer structure design review and approval to UPRR for structures spanning lines belonging to or operated by both. Plan sets should be submitted to all applicable railroad companies, with UPRR being primarily responsible for reviewing and approving the plan sets for structures shared with UTA or other railroad companies.





Requirements for structures involving UTA Commuter Rail (Frontrunner) are provided in Chapter 7, Structures of the Utah Transit Authority Commuter Rail Design Criteria [UTA Commuter Rail Design Criteria Revision 2a](#)

Requirements for structures involving UTA Light Rail (TRAX) are provided in Chapter 7, Structural, of the Utah Transit Authority Light Rail Design Criteria [UTA Light Rail Design Criteria Revision 5](#)

Best Practice No. 2

Predicate All Design on Railroads' Unique Standards

“Often, when delays occur, it is because submittals come late in the project development, they are incomplete, or are not predicated on advice received from earlier rail coordination. Such conditions can add months to the review process.”

“...it is important not only to include the proper information but also to include it in the format and sequence to which the railroads are accustomed. Having the right information but in the wrong format can lead to delays and confusion.”

SHRP 2 Report S2-R16-RR-1

1S1 Identify Preliminary Structure Type

- Concurrent Tasks:
 - 2U1 – Utility and Railroad Identification
 - 1J1 – Identify Existing Right of Way

**3S1 Develop Structure Type Selection Report (TSR)
Discuss Structure Type, Track Configurations, and
Clearances with Railroad Companies (if applicable)**

Work with the Region Utility and Railroad Leader to coordinate project details with the railroad companies. Early coordination with the railroad companies is critical.

- Prepare the preliminary layout to show the existing track configuration and the spacing perpendicular to the tracks.
- Inform the railroad companies that they will have an opportunity for review of the Situation and Layout before final design begins and a final review of the complete plan set when design is complete. It is important that the railroad companies are kept informed in the earlier stages to avoid impacts to the project.

3S3 Develop Situation and Layout for Rehabilitation

3S5 Develop Situation and Layout for Structure

3S6 Situation and Layout Acceptance



OVERALL GEOMETRY CONSENSUS

Consensus must be reached on overall geometry at Situation and Layout acceptance. It is important that the railroads are kept informed in the earlier stages to avoid impacts to the project schedule.

Railroad Discussion

Discuss requirements with respect to the following items (other items may apply):

- *Vertical and horizontal clearances*
- *Corrected track separations and future tracks*
- *Structure type*
- *Crash walls*
- *Fencing and understructure lighting*
- *Construction phasing, shoring, soil stabilization, etc.*

Best Practice No. 3

Anticipate Time Frames for Review

“The need for coordinated, fully considered comments requires time from the railroads. The structures department, the operations unit, the construction department, the signal and communication division and the real estate or legal department routinely all need to coordinate their comments on a project.”

SHRP 2 Report S2-R16-RR-1

4S4 Design and Detail Bridge

- Concurrent Tasks:
 - 4U2 – Prepare Utility and Railroad Agreements
 - 4U3 – Complete Utility and Railroad Plans and Documents
 - 4J1 – Identify Right of Way Needs
 - 4J2 – Right of Way Plans and Documents

5S1 Deliver Final Structure Approval

- Concurrent Tasks:
 - 5U1 – Deliver Utility Certification
 - 5L1 – Deliver Right of Way Certification

Railroad Coordination Responsibilities for Grade Separation Projects

Region Utility and Railroad Leader

- Facilitate and oversee coordination within the team
- Ensure railroad company participation
- Review and transmit formal submittals
- Track submittals, review durations, comment resolution and approval
- Prepare Agreements for Statewide Utility and Railroad Engineer and Legal Review
- Compile attachments (approved plans and ROW documents)
- Provide Special Provisions
- Fund, execute and distribute Agreements

Structure Designer

- Design structure to accommodate railroad company requirements
- Comply with railroad company specifications and guidelines
- Prepare and provide submittal packages to Utility and Railroad Leader
- Prepare theoretical structure cost estimate for determination of railroad participation if required
- Address railroad company comments
- Provide estimated construction duration for flagging protection

Right of Way Lead

- Identify existing Railroad Right of Way
- Identify existing highway property rights
- Determine property rights required by project
- Prepare and provide ROW plans and legal descriptions to Utility and Railroad Leader
- Prepare and record ROW Instruments

3.5. CRITICAL ITEMS AND PROCESSES

This section is intended to outline critical items and process that can impact the scope, schedule and cost of a project.

3.5.1. RIGHT-OF-WAY PROCESSES AND ACQUISITIONS

Railroad property right acquisitions need to be identified and prioritized during the planning and scoping stage of the project. Both existing and required property boundaries and aerial property right needs must be identified and reviewed by the UDOT Project Manager and the Railroads' property management staff. All pertinent right of way information shall be gathered and maintained in the project file.

Depending on the ownership of the right of way being impacted, several types of property rights and access permissions may be required including Temporary, Permanent, and Aerial Easements or Licenses. Property rights obtained through agreements are commonly identified as :X Parcels. These permissions are granted in the form of recordable instruments with associated fees. Coordination between the right of way owners should occur early and often in the project in order to understand the impacts to both parties.

Railroad Property Acquisition Decisions

It is imperative that structure geometry and grade crossing design decisions affecting railroad property right requirements be made as early as possible in the design process to avoid delays. Critical issues to be addressed include:

- *Structure width and span length.*
- *Placement of abutments or piers on railroad ROW*
- *Grade crossing width and pedestrian requirements.*
- *Relocation of signal bungalows.*

UDOT has developed template recordable instruments for the acquisition of property rights from UPRR and UTA. Contact the Region Utility and Railroad Leader for copies of the approved templates. Do not modify the templates without approval by UDOT Central Right of Way and Legal Counsel.

“Acquisition of right-of-way by a State highway agency on behalf of a railroad or acquisition of non-operating real property from a railroad shall be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.”

23 CFR 646.216

The acquisition of property rights required for the use of operating railroad property for highway purposes is included as part of the railroad Project Agreement or License. The purchase or sale of non-operating property from or on behalf of railroad companies is handled as a Right of Way acquisition. For the modification of existing Crossings or reconstruction of existing structures, every effort should be made to review and reference the original bridge or Crossing agreement and establish the limits of existing property rights when determining if additional property rights are required to accommodate the

project. UDOT is responsible to identify the existing railroad ROW and prepare legal descriptions, right of way plats and recordable instruments indicating the proposed property rights to be acquired as a result of the project.

For more information about Right of Way processes and acquisitions, refer to the [Right of Way Operations Manual](#) and the [Right of Way Design Manual](#).

3.5.1.1. Union Pacific Railroad

For property rights required from UPRR, property legal descriptions and plats prepared by the project team are submitted to UPRR by the Region Utility and Railroad Leader through the Manager of Industry and Public Projects. The information is forwarded to UPRR’s Right of Way Department in Omaha for review and determination of fees for permanent and/or aerial easements required by the project. UPRR calculates fees based on the area of new property required, not to include the area occupied by the existing highway facility as indicated in the original Crossing agreement or previous project right of way files.

Upon receiving the proposed fee amount from UPRR, the Utility and Railroad Leader will submit the fee to the Deputy Director of Right-of-Way for review and approval.

- If the proposed fee is acceptable, the amount will be included in and paid under the Project Agreement, and the approved ROW information attached to the agreement as an exhibit. A copy of the executed Project Agreement must be provided to Central ROW in order for ROW Certification to be issued.
- If the proposed fee is not acceptable, the Central ROW Division will obtain an appraisal and follow the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act and UDOT’s Right of Way Operations Manual to acquire the necessary property rights.

Upon approval and payment of the fee, an appropriate easement instrument will be executed, recorded by the Project Right of Way Lead, and a copy retained by Central ROW for their records.

3.5.1.2. Utah Transit Authority

By mutual agreement, UTA's real estate usage (license) and administrative fees are waived for UDOT facilities on UTA property. If the project requires acquisition of fee simple property, follow the following process for determining value:

- Property < \$250,000 both agencies may agree on an acceptable value
- Property > \$250,000 value to be determined by an independent appraiser mutually acceptable to both agencies

When property rights are required for a highway project or safety improvement project, the project team prepares and the Region Utility and Railroad Leader submits to UTA the legal description and ROW plat indicating the UTA property required. UTA will review and include this information in the Agency License Agreement. UTA prepares the Agency License Agreement. Upon execution, the project Right-of-Way Lead records the corresponding Memorandum of Agency License Agreement.

3.5.1.3. Acquiring Property Rights on Behalf of Railroads

When it is necessary to obtain replacement ROW for the relocation of Railroad facilities, UDOT is responsible to determine the size and location of the replacement property, subject to the approval of the Railroad. Replacement properties should be purchased directly into the name of the Railroad. Parcels purchased in the name of Railroads are commonly identified as: Z Parcels.

3.5.2. BUY AMERICA REQUIREMENTS

Buy America requirements apply to railroad work on Federal Aid projects. Agreements for these projects must contain Buy America provisions when manufactured iron and steel products are installed as part of the railroad surface or signal construction. As with highway construction materials, submittal of documentation indicating Buy America compliance is required before railroad companies or their contractors install iron and steel materials.

Railroad companies must be informed of Buy America applicability to project work during the design phase of the project.



Recent FHWA clarifications apply to railroad system materials. Items must be predominately iron or steel to be subject to Buy America. Consistent with the public interest waiver, miscellaneous iron and steel parts, off the shelf items, components and subcomponents are not subject to Buy America provisions. Examples of rail system materials include, but are not limited to:

Work Type	Subject to Buy America	Not Subject to Buy America
Track and Crossing Surface Materials	Rail, precast concrete Crossing panel end frames and reinforcing steel, concrete tie reinforcing steel.	Miscellaneous hardware, tie plates, lifting inserts, clips, screw spikes, rail anchors, lags, weld studs.
Signal System Equipment	Masts, poles, cantilevers, bridge structures, foundation reinforcing steel, concrete pad reinforcing steel.	Miscellaneous hardware, light units, hoods, backgrounds, gate arm mechanisms, bell components, wayside horn components, power, signal and preemption system components, sign mounting hardware.

If railroad work is done as part of UDOT's contract, the documentation requirements in Standard Specification 01455 Section 1.16 Buy America apply.

Railroad companies must be informed of Buy America applicability to their work during the design phase of the project. Resident Engineers must be familiar with railroad work and details, and must have the necessary Buy America certification documentation in hand prior to railroad work beginning on the project.

Buy America documentation requirements will be included in the railroad company's Project Agreement and should be discussed with the railroad company representatives at the Preconstruction Conference. Please coordinate with the Region Utility and Railroad Leader for questions and clarification on specific project Buy America requirements.

3.5.3. EARLY COORDINATION AND ENGINEERING SUBMITTALS

National research has identified that the lack of early coordination with railroads, inaccurate and incomplete engineering submittals, and unrealistic review time frame expectations by transportation agencies are major contributors to delays in highway project delivery. Following is a list of considerations and best practices to follow when coordinating with railroad companies.

Coordinate Early

Coordination with railroad companies should begin at the project concept or early planning stages. Early coordination is particularly important for any project that will create horizontal or vertical constraints on the railroad right of way, require the construction or modification of grade Crossing active warning devices or interfere with track operations. Initial coordination must occur before overpass structure type, size and alignment, or before at grade Crossing geometry and traffic control device decisions are made. These basic decisions need to be discussed, clarified and communicated with railroad companies as early as possible.

Predicate All Design on Railroads' Unique Standards

Highway and structure designers need to be knowledgeable in railroad industry and individual railroad company standards and guidelines, as well as the UDOT's highway and traffic control regulations and standards that apply to highway railroad Crossing design. Accurate, correct and complete railroad structure design plans and specifications are also vital to timely project delivery. It is imperative that engineering submittals be complete, accurate and in compliance with railroad requirements before submittal to railroad companies.

“Partial, incomplete or inadequate submittals will be rejected, thus delaying approval. Revised submittals will follow the same procedure as the initial submittal until all issues are resolved.”

UPRR Guidelines for Railroad Grade Separation Projects

Anticipate Time Frames for Review

The finality of highway construction work compels railroads to make measured, fully informed decisions about project impacts. A project may affect multiple departments within a railroad, and coordinated, fully considered comments require time. UPRR provides minimum time frames for structure design reviews, but at-grade Crossings design review time frames are difficult to anticipate due to the wide range of project complexity and railroad staff workloads. While highway agencies blame project delivery delays on lengthy railroad review times, railroads counter that the timing and completeness of the submittal is critical to the railroad's ability to provide timely comments. In order to facilitate the best possible outcome with respect to railroad review times, the following best practices are recommended:

- Prioritize decisions, designs and the identification of right of way needs for railroad related project features.
- Provide for railroad companies' published minimum review times in project delivery schedules. More complex designs such as at-grade Crossings requiring signal preemption will require longer review times.
- Acknowledge that repeating submittals to correct errors or incorporate comments will restart the review time frame.
- Avoid multiple iterations and last minute plan changes.

3.5.4. FEDERAL REQUIREMENTS FOR RAILROAD COMPANY PARTICIPATION IN GRADE SEPARATION STRUCTURE COSTS

[23 CFR 646.210](#) requires that Railroads participate in the cost of projects that eliminate existing grade Crossings at which active warning devices are in place or ordered to be installed by UDOT. The Railroads' required 5 percent share of the cost is based on the costs for preliminary engineering, ROW and construction of the structure and approaches which are being constructed due to presence of the Railroad, for the number of lanes on the existing highway and in accordance with the current design standards of UDOT. An example of a theoretical structure cost estimate for determining the railroad's 5 percent cost share is provided in the **Appendix X1. Example Theoretical Structure Cost Estimate for Railroad**. Where another facility such as a highway or waterway requiring a bridge structure is located within the limits of a grade

A railroad company's 5 percent participation cost estimates will be attached to the Project or License Agreements. Any proposals to offset property use fees or other considerations against a railroad company's required participation must be supported with cost documentation and approved by the Statewide Utilities and Railroad Engineer and Director of Right of Way.

separation project, the estimated cost of the theoretical structure and approaches to eliminate the Crossing should be calculated without considering the presence of the waterway or other highway.

If more than one Railroad's Crossing signals are being eliminated by one grade separation structure, UDOT typically prorates the 5 percent share of the structure costs between the companies based on the proportional lengths of the span over their respective ROW. The amount of the Railroad's share of the cost is calculated, approved and paid as a Lump Sum, and the payment is typically made when the Crossing is completely out of service and removed.

ENVIRONMENTAL CONCERNS

Historically, railroad corridors have varying degrees of potentially hazardous environmental contaminants including grease, oil, diesel fuel and other hydro carbons. In the early part of the 20th century, Railroads in Utah used slag ballast that contains additional potentially hazardous, reportable levels of contaminants and metals. In some rail-banked corridors, the slag ballast can be successfully capped in place if it not disturbed. If rail corridors are to be reconfigured or if excavation and removal of potentially



hazardous material is anticipated, testing, special handling and disposal methods may be required at the discretion of the Railroad.

UTA has extensive DEQ and EPA commitments on corridors purchased from UPRR, commitments that are assigned to users occupying their property by License Agreement. All applicable environmental regulations and safety precautions are subject to UTA review and approval, and must be followed when planning, designing and constructing Safety Improvement and Highway Improvement projects.

CHAPTER 4:

RAILROAD AGREEMENTS

Best Practice No. 4

Use Standard Designs and Legal Agreements

“Many state DOTs and railroad companies have negotiated standard legal agreements and standard designs. Use them, advise the railroads.”

SHRP 2 Report S2-R16-RR-1

[23 CFR 646](#) and [Utah Administrative Rule R930-5](#) provide minimum requirements for state-railroad agreements. UDOT has developed statewide and project level standard agreement templates with both the Union Pacific Railroad Company and Utah Transit Authority that meet federal and state minimum requirements but are very different in structure, content and process. A summary of the individual railroad companies’ agreements is provided later in this section.

4.1. FEDERAL RAILROAD AGREEMENT REQUIREMENTS

When construction of a federal aid project requires the use of railroad properties or adjustments to railroad facilities, 23 CFR 646 requires an agreement in writing between the State highway agency and the railroad company. All written agreements must include:

- The provisions of 23 CFR 646 and [23 CFR 140](#), subpart I by reference
- A detailed statement of the work to be performed by each party
- Method of payment (actual cost or lump sum)
- For projects which are not for the elimination of hazards of railroad-highway Crossings, the extent to which the railroad is obligated to move or adjust its facilities at its own expense.
- The railroad’s share of the project cost

- An itemized estimate of the cost of the work to be performed by the railroad
- Method to be used for performing the work, either by railroad forces or by contract
- Maintenance responsibility
- Form, duration and amounts of any needed insurance
- Appropriate reference to or identification of plans and specifications
- Statements defining the conditions under which the railroad will provide or require protective services during performance of the work., the type of protective services and the method of reimbursement to the railroad
- Provisions regarding inspection of any recovered materials.

4.2. STATE RAILROAD AGREEMENT REQUIREMENTS

Utah Administrative Rule R-930-5 restates the federal agreement requirements as follows:

- Where construction of a Highway Project or Safety Improvement Project requires use of Railroad properties or adjustments to Railroad facilities, an agreement must be prepared between UDOT and the Railroad.
- Master agreements between UDOT and a Railroad on an area wide or statewide basis may be used. These agreements will contain the specifications, regulations, and provisions required in conjunction with work performed on all Crossing projects.
- On a project-by-project basis, the written agreement between UDOT and the Railroad shall include the following minimum requirements:
 - Reference to appropriate federal regulations
 - Detailed statement of the work to be performed by each party
 - The extent to which the Railroad is required to adjust its facilities
 - The Railroad's share of the project cost
 - An itemized estimate of the cost of the work to be performed by the Railroad
 - Method to be used for performing the work, either by Railroad forces or by contract
 - Maintenance responsibility
 - Form, duration, and amounts of any needed insurance

- Appropriate reference to or identification of plans and specifications.
- On matching fund agreements between UDOT and a Highway Authority, the written agreement shall include the following minimum requirements:
 - Description of work and location, city, county, and state
 - Reference to federal regulations that matching funds will be provided by the Highway Authority
 - Detailed statement of work to be performed by each party regarding design, agreements, inspection, and maintenance
 - Statement of finances of project and matching funds to be provided by Highway Authority, deposits, invoices, and cost overruns or underruns
- Agreements for industry track Crossings are prepared between the Highway Authority and the industry.

In order to prevent a Crossing Safety Improvement project from becoming unduly delayed, a six-month period should be expected from the issuance of the Railroad agreement to completion of work by the Railroad involved. Should more than the specified period elapse, UDOT shall require the Railroad to proceed with the work covered by the agreement under the authority contained in Section 54-4-15 and approval from the FHWA will be solicited in conformance with 23 CFR 646.

4.2.1. SUMMARY OF UPRR MASTER AGREEMENT FOR AT GRADE CROSSING SAFETY IMPROVEMENT PROJECTS DATED MARCH 6, 2013

The terms of this UPRR Master Agreement apply to At Grade Crossing Safety Improvement Projects initiated by the Chief Railroad Engineer in UDOT's Traffic and Safety Division in cooperation with Local Agencies and UPRR. Projects covered by the Master Agreement are joint UDOT and UPRR projects using federal funding; as such UPRR has certain obligations it must meet to receive funding for eligible safety improvements related to the projects. Crossing Safety Improvement Projects are typically assigned to a Project Manager and Resident Engineer in the Region for construction management. The Master Agreement is provided as **Appendix X2 UPRR Master Agreement for At Grade Crossing Safety Improvement Projects**. Provisions of the Master Agreement include:

UPRR to Make Installations

- UPRR will, at the expense of UDOT, furnish all necessary plans, specifications, material estimates, labor, materials, flagmen, equipment, and will install all appurtenances and surface improvements within UPRR's ROW. UPRR will not begin installation of appurtenances and surface improvements until authorization is received from UDOT.

UDOT RAILROAD COORDINATION MANUAL OF INSTRUCTION

Prior Notification of Work

- UPRR will provide 48 hour notice to UDOT's RE before performing any work covered by these agreements.
- In certain circumstance UPRR may experience a circumstance that necessitates the performance of emergency work which may interrupt work on the Safety Improvement Project. However, UPRR must notify the RE when work is expected to continue. Failure to do so could result in disallowance of reimbursement for any portion of the Railroad's unsupervised work on the project.
- On projects where the work can be accurately estimated and UDOT and the UPRR have agreed to lump sum payment as described in 23 CFR 140 Subpart I and 646 subpart B, there will be no requirement for daily record keeping nor for audit and reimbursement shall be made in conformance with Section 6 of this agreement. However, prior notification requirements still apply.

Maintenance and Operation of Warning Devices

- Typically, UPRR is responsible for the maintenance of active and passive warning devices located in the Railroad ROW. The Highway Authority is typically responsible for passive warning devices (signs and pavement markings) outside the Railroad ROW.

Maintenance and Operation of Crossing Surface Improvements

- UPRR is responsible for maintaining the Crossing material within the Railroad ROW between rails including space between multiple tracks and two feet beyond each outside rail for Crossings without concrete panels, or to the edge of concrete panel if panels are installed. Surface materials not defined as UPRR's responsibility above are the responsibility of the Highway Authority.

Interference with UPRR Operations

- All UDOT work associated with Safety Improvement Projects, including maintenance of Highway facilities and appurtenances constructed on UPRR property will be performed without interruption to or delay to UPRR operations or of others lawfully occupying or using the property of facilities.
- UDOT shall not do, suffer or permit anything that will or may obstruct, endanger, interfere with, hinder or delay maintenance or operation of the UPRR's tracks or facilities, or any communication or signal lines, installations or any appurtenances thereof.

Protection of Fiber Optic Cables Systems

Fiber optic cable systems may be buried on UPRR's property. UDOT or its contractors shall telephone UPRR at 1-800-336-9193 (a 24-hour number), to determine if fiber optic cable is buried anywhere on the Railroads premises to be used by UDOT. If cable is present, UDOT will contact the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the Railroad's premises.

4.2.2. SUMMARY OF UNION PACIFIC RAILROAD AGREEMENTS

Following is a current overview of the types, purpose and content of agreements between UDOT and Union Pacific Railroad Company. These agreements have been approved for use by UPRR and UDOT and cannot be modified without the permission of the Statewide Utilities and Railroad Engineer and Legal Counsel. Copies of approved project agreement templates are available from the Region Utility and Railroad Leaders.



Construction & Maintenance Agreements

The content and format of agreements between UDOT and UPRR include all required federal and state requirements as well as UDOT specific requirements and instructions. Occasionally updates or additions are made at the program level. Be sure to contact the Region Utility and Railroad Leader to obtain the most recent agreement format.

Preliminary Engineering Agreement

Optional for use when a project is speculative in nature, requires lengthy engineering work, extensive railroad input, or at risk of delay or cancellation. Provisions include:

- Preliminary engineering and other related services
- Development of cost estimates
- Review of the project's preliminary layouts
- Submittal of current train and switching moves

Flagging Agreement

Applicable when a highway improvement project requires work within 25 ft. of UPRR property but does not impact railroad facilities or require property rights.

- Railroad's Share of Project Cost
- Work to be Performed in Proximity to UPRR Property
- Contact Information
- Estimate of Cost
 - Flagging
- Exhibit A – Site Plan
- Exhibit B – UPRR Flagging Cost Estimate

Pipeline and Wireline Crossing Agreements - Refer to Chapter 7

Statewide Master Agreement for Highway Improvement Projects (Proposed)

Applicable to all highway improvement projects; provisions include:

- Partnering
- Applicable Laws and Regulations
- Preliminary Engineering, Right of Way
- Project Agreements
- Billings and Audits
- Maintenance Responsibility – Utah Administrative Code R930-5
- Indemnity, Miscellaneous
- Termination, Modification, Expiration of Agreements
- Exhibits to Master Agreement

Grade Separation Structure Project Agreement

- Railroad's Share of Project Cost
- Contact Information

- Placement of Bridge Supports
- Estimate of Cost
 - Engineering Review and Inspection
 - Flagging
 - Reimbursable Railroad Work
 - Easement Fees
- Easements
- Exhibit A – Bridge Plans and Specifications
- UPRR Share of Project Cost Calculation (if applicable)
- UPRR Engineering, Flagging and Inspection Cost Estimate
- Easement Description and Fee Calculation
- Easement Deed

At Grade Crossing Project Agreement

- Railroad's Share of Project Costs
- Contact Information
- Estimate of Cost
 - Engineering Review and Inspection
 - Flagging
 - Reimbursable Railroad Work, Surface and Track
 - Reimbursable Railroad Work, Signals
 - Easement Fees
- Easement Fees
- Authorizations
- Exhibit A – Grade Crossing Plans and Specifications
- Exhibit B - UPRR Engineering, Flagging and Inspection Cost Estimate

- Exhibit C - UPRR Railroad Work Cost Estimate, Surface and Track
UPRR Railroad Work Cost Estimate, Signals
- Exhibit D – Easement Legal Descriptions and Fee Calculations
- Exhibit E – Easement Deeds

4.2.3. SUMMARY OF UTAH TRANSIT AUTHORITY AGREEMENTS

Following is a current overview of the types, purpose and content of agreements between UDOT and Utah Transit Authority. These agreements have been approved for use by UTA and UDOT Management and cannot be modified without the permission of the Statewide Utilities and Railroad Engineer and Legal Counsel.



Agency License Agreements, Memorandum of License Agreements and Project Reimbursement Agreements are prepared by UTA based on information provided by UDOT. Copies of the Statewide Partnering Agreement and Agency License Agreement and Reimbursement Agreement format can be obtained from the Region Utility and Railroad Leaders.

Statewide Partnering Agreement (Pending)

This reciprocal agreement is applicable to UDOT highway projects impacting UTA facilities and UTA rail projects impacting UDOT facilities. Provisions include:

- Partnering
- Issue Resolution Process and Principals
- Project Impacts
- Property Exchanges
- Existing Unlicensed Facilities
- Fees
- Reimbursement for Project Work
- Grade Crossings
- Miscellaneous

Agency License Agreement

Applicable for highway improvement projects, maintenance activities and utility installations impacting UTA facilities or property.

- Rights Granted
- Construction
- Design Changes
- Costs
- Contaminated Soils
- Access
- Insurance
- Indemnity

- Exhibit A – Design Plans
- Exhibit B – Work Plans
- Exhibit C – Special Conditions

Recordable Memorandum of Agency License Agreement

- References the Statewide Agreement and Project License Agreement
- Exhibit A – Legal Description and Plat

Project Reimbursement Agreement

Applicable to highway projects requiring reimbursable UTA flagging protection or contract inspection.

- Scope of Work
- Cost Estimate
- Special Provisions
- Invoicing
- Exhibit A – Scope of Work
- Exhibit B – Cost Estimate



4.3. HIGHWAY CROSSING DESIGN SUBMITTALS

The UDOT Region Utility and Railroad Leader notifies the Railroad Project Manager of proposed work and anticipated scope and request a Diagnostic Review of the Crossing during the Planning/Scoping Stage of the project. 30 percent or 60 percent Crossing design drawings should be sent to the Railroad Project Manager and UDOT Chief Railroad Engineer for review. See **Section 3.4 UDOT PROJECT DELIVERY NETWORK** for more information about railroad grade Crossing design. Crossing agreements between UDOT and Railroads will not be finalized until the Railroad and the UDOT Chief Railroad Engineer have reviewed, commented on and approved the 100 percent Crossing design plan set. The time required to complete this process varies between Railroads. Coordination should be made to ensure the project schedule is not delayed by this process.

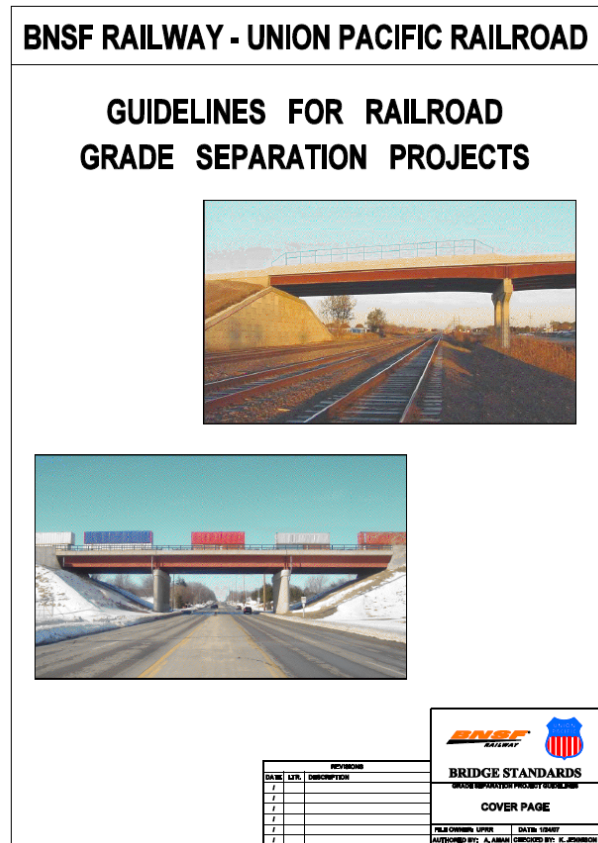
4.3.1. ANTICIPATED COSTS ASSOCIATED WITH CROSSING PROJECTS

Below is a table outlining general costs associated with a Crossing project. All projects are to be treated on a case-by-case basis; the costs provided simply offer a general idea as to what a reviewer may anticipate for Crossing components. This reference may be useful when planning and scoping discussions are taking place with stakeholders. Being able to identify how certain aspects of the Crossing may impact cost is a large benefit to the decision making process.

Typical Railroad Component Costs to a Project				
Item	Units	Safety Projects	Highway Projects	Notes
Crossing Surface (Concrete Panels)	L.F.	\$1,500	\$2,000	Crossing Surface includes all materials required for a complete crossing. Items include but are not limited to: ballast, track, panels, pavement, rubber insulation, etc... Length shall be measured along centerline of track across roadway and include a 2 ft. panel extension on either side of the roadway pavement, travelled way or sidewalk depending.
Lights & Gates	EA	\$137,000	\$175,000	Includes materials, labor and installation. Track circuitry, signal houses, foundations, etc... should be included in this cost.
Flagging	Per Day	\$1,000	\$1,000	Includes certified railroad flagmen.
Cantilever Structure	EA	\$50,000	\$50,000	Cost of Cantilever structures vary greatly from project to project depending on numerous factors such as length, number of traffic lanes, number of flashing light pairs, and soil stability.

4.4. GRADE SEPARATED CROSSINGS

In General, design plan submittals for overhead structures (highway over) should be made at Concept, 30 percent and 100 percent. Please refer to the [Joint BNSF/UPRR Guidelines for Railroad Grade Crossing Separation Projects](#) and Section 3.4 UDOT PROJECT DELIVERY NETWORK, for complete instructions. Concept submittals should include concept plans and site pictures. 30 percent plan submittals should include the situation and layout sheets indicating that the minimum design and safety requirements have been addressed, as per the overhead structure submittal requirements of UPRR. Project specifications, drainage reports, geotechnical reports, shoofly design (if applicable) should also be provided. Plans and specifications for rehabilitation projects on structures over Railroad facilities must also be submitted to the Railroads for information, review and determination if an agreement between the Railroad and UDOT is required.



Even though overhead structure agreements between UDOT and the Railroads are typically finalized based on approval of the 30 percent plan submittal, final signed and stamped 100 percent structure plan sets, project specifications, special provisions, drainage reports, and geotechnical reports are to be submitted to the Railroad for their records.

Underpass structures (railroad over) require the submittal of additional structural calculation details and full plan sets. Agreements for underpass structures are typically not finalized until the 100 percent structure design has been approved by the Railroad.

4.5 AGREEMENT PREPARATION AND IMPLEMENTATION

UTA License Agreements, Recordable Memorandum of License Agreements and Reimbursement Agreements are prepared by UTA with support and information provided by the Region Utility and Railroad Leader. UPRR and other railroad company agreements can be drafted and the support documents compiled by the UDOT Region Utility and Railroad Leader or Coordinator or by consultant team members. All agreements, including those compiled by UTA, consultants or design build teams, must follow [UDOT Policy and Procedure O8E-04, Coordination and Execution of Agreements with Railroad Companies Required on](#)

[UDOT and Railroad Projects](#). Agreements must be submitted for review and recommended for approval by the UDOT Region Utility and Railroad Leader and signed by:

- The Region Director or designated Project Director
- The Statewide Utilities and Railroad Engineer
- the Director of Right of Way (if property rights are included)
- UDOT Counsel (unless a preapproved form is used)

Agreements with railroad companies on Federal Aid projects must be forwarded to FHWA for review and approval.

The Region Utility and Railroad Leader posts copies of executed railroad agreements in Projectwise and provides a link to the Project Manager, Statewide Utilities and Railroad Engineer, Deputy Director of Right of Way, Resident Engineer, Contracts and Compliance Specialist, Internal Audit, Planning and Programming and the Comptroller's Office.

Upon receipt of the executed agreement copies, the Contracts and Compliance Specialist enters agreements including reimbursement into PDBS under Utility Agreements.

CHAPTER 5:

RAILROAD COORDINATION DURING CONSTRUCTION

Effective coordination and compliance with Railroad requirements is vital to the success of projects with Railroad facility impacts. Standard Specification 00725 Scope of Work, 1.15 Railway-Highway Provisions, gives UDOT's contractors specific instructions and responsibilities for coordinating with Railroads. It is important that the UDOT RE ensure that contractors strictly comply with the standard specification while working on projects with Railroad involvement. The contractor is given further instructions as part of the contractor's right of entry agreement that is required before work can begin on Railroad property

The most important aspect of Railroad coordination during construction is safety; the safety and protection of the highway and Railroad workers, the travelling public, the protection of property and the Railroad's operations.

The RE will generate a full project contact list at the beginning of any construction project with listings of ALL participants in the project, updating as necessary. The contact list is to be made available to railroad representatives, inspectors, and managers.

All construction operations shall also conform to and refer to the [UDOT Construction Manual of Instruction](#).

5.1. PRECONSTRUCTION CONFERENCE, NOTIFICATION TO RAILROAD

UDOT's contractor is required to hold a preconstruction conference at least 15 days before beginning any construction work on Railroad ROW and to give written notice to the UPRR Manager of Industry and Public Projects, UTA Sr. Program Manager of Operations, or equivalent position for the Railroad. The contractor is responsible to coordinate the work schedule with the Railroad.

5.2. CONTRACTOR RIGHT OF ENTRY

Right of entry agreements must be obtained by the highway contractor prior to commencing work within or encroaching on Railroad ROW. Instructions for obtaining [UPRR Right of Entry Agreements](#) are available through the UPRR website or by contacting the Railroad Project Manager identified in the project contact sheet. Right of entry agreement forms are occasionally provided to UDOT as part of the project agreement.



The contractor right of entry form from UTA can be obtained by submitting an application to the Property Administrator identified in the contract documents. Information about [UTA Right of Entry](#) is available on the UTA Website.

Contractor rights of entry agreements bind contractors to strict requirements for safety, coordination and liability on a project. A copy of the contractor's right of entry agreement must be provided to the UDOT RE and also kept on site during the completion of the work.

The contractor must give at least 48 hours verbal notice to the manager of track maintenance identified in the contractor's right of entry agreement before beginning work.

5.3. INSURANCE REQUIREMENTS

Insurance requirements vary by Railroad and the type and scope of the project. In general, Contractors are required to provide proof of commercial general liability, business automobile, workers compensation and employer's liability, railroad protective liability, umbrella or excess, and pollution liability coverage before right of entry will be granted.

[UTA's Insurance Requirements](#)

[UPRR's Insurance Requirements](#)

5.4. FLAGGING AND PROTECTIVE SERVICES

Flagging



UDOT's standard specifications provide that UDOT does not reimburse Contractor's for Railroad flagging and inspection. Contractors are instructed to determine the cost of required Railroad flagging, inspection and cleanup and to include the cost in mobilization. UDOT pays the Railroad directly for verified billings and deducts payment from the Contractor's pay estimates under a construction accounting item for Railroad flagging, inspection and cleanup. No other compensation for this item is allowed.

Under this payment approach, the contractor is responsible to determine the anticipated cost of Railroad flagging required based on their schedule for the completion of the work, and to insure that the cost is covered in their mobilization item. The contractor must take into account the notice required to order and release a flagger, gaps in the work schedule, double shift work, weekend work and holiday work, when anticipating the cost of flagging that will be required. The estimated cost of flagging protection by UPRR is \$1100 for a 12 hour day and \$990 per day for

UTA. These prices include additives, contingencies and vehicle. Refer to the Contractor's Right of Entry form for more information.

According to the UDOT standard specifications, the contractor is also responsible for the cost of inspections performed by the Railroad during the construction of the project, and any cleanup of the Railroads property that is required as a result of the contractor's operations.

At no time unless expressed written consent is obtained from the Railroad can UDOT or its contractors allow either personnel or equipment to be closer than twenty-five (25) feet of UPRR's track or ten (10) feet of UTA's track without the presence of a Railroad flagman. When equipment is not in use, it shall be kept at least fifty (50) feet from the centerline of the Railroads nearest track.



Railroad flagmen, inspectors or managers typically have the right to stop work on or through the property of the Railroad if the work being performed is deemed hazardous by the Railroad to its property and/or operations. Additionally, flagmen, inspectors or managers have the right to stop work on or through the property of the Railroad if the work being performed is contrary to the project plans, specifications and/or Railroad guidelines.



Form B Track Designation

A "Form B" track designation is the Railroads method of alerting train traffic to construction activities within the Railroad ROW. It informs train crews where and when construction zones effect Railroad tracks, and instructs the train crew to contact the Employee in Charge (EIC) or Railroad flagman before entering the construction zone. The Form B also provides train speed and notice (sound horn / bells) restrictions within the construction zone.



When a train approaches a Form B construction zone, the train crew contacts the EIC and requests instructions for traveling through the construction zone. The EIC alerts construction crews of the approaching train, ensures that all men and equipment are clear of the track before allowing the train access, and then provides instructions to the train crew. The EIC monitors train traffic and the construction crews, and must not perform other duties while providing flagmen protection.

Railroad Operations, Work Windows

UDOT’s contractors are responsible to coordinate work windows with UDOT and the UPRR. Conditional work windows are periods of time when Railroad operations have priority over construction activities. This is the normal status during work on projects when flagger protection is provided.

On Track Safety Roadway Worker Protection	
OTS	On Track Safety--prevent death or injury to roadway workers
Roadway Worker	Railway Worker or Contractor to a Railroad
Job Briefing	Everyday before occupying Right of Way
EIC	Employee in Charge
MCT	Minimum Clearance Time: 15 Seconds
POC	Point of Contact
GCOR	General Code of Operating Rules
FRA	Federal Railroad Administration
PPE	Personal Protective Equipment: Hard Hat, Safety Glasses, Proper Footwear, Orange Safety Vest w/Reflective Stripes

<p>Foul Zone</p> <p>4' FRA Minimum</p> <p>25' Union Pacific Railroad Rule</p>	<p>"Form B"</p> <p>MP 797.75 MP 802.25</p> <p>2 miles 2 miles</p> <p>Working Limits</p> <p>EIC has total control of "Form B" working limits</p>
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An Absolute Work Window is when construction activities are given priority over Railroad operations, such as when tracks are taken out of service for bridge demolition or girder placement. Any request for an Absolute Work window must meet strict requirements, requires advance planning and a detailed explanation for review and approval by the Railroad.



5.5. SAFETY TRAINING REQUIREMENTS

It is the responsibility of the UDOT contractor to ensure all personnel performing work within or encroaching on a Railroad ROW, including but not limited to the contractor's employees, subcontractors, UDOT personnel, and Inspectors have the necessary training and credentials. Training requirements for each Railroad vary; see below for training requirements for specific Railroads.

UPRR:

[Roadway Worker Protection \(RWP\)](#)

[Contractor Orientation Course\(s\) and Photo ID Badges for Contractors \(UPRR\)](#)

[Minimum Safety Requirements for Contractors](#)

UTA:

[UTA Roadway Worker Protection Training Information](#)

[Roadway Worker Protection \(RWP\)](#)

[Contractor Orientation Course\(s\) and Photo ID Badges for Contractors \(UTA\)](#)

UCRY:

[Roadway Worker Protection \(RWP\)](#)

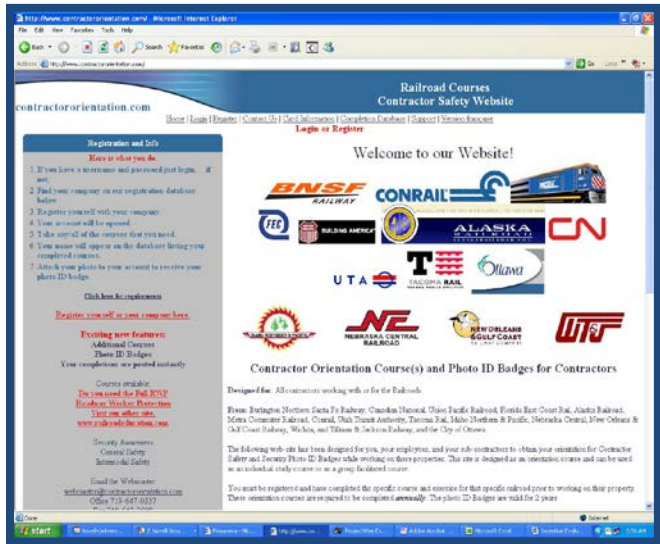
SLGW:

[Roadway Worker Protection \(RWP\)](#)

UTAH:

[Roadway Worker Protection \(RWP\)](#)

If work is being performed in, around or through a Railroad not listed above, the UDOT RE shall contact the Railroad to determine what training requirements and credentials are necessary for work within the ROW. While contractors may provide Railroad worker safety training, this training does not supersede the training and certifications provided by the Railroad.



The UDOT RE shall keep safety related records of all personnel working within the Railroad ROW, including training certifications, expiration dates of said training and attendee lists from daily safety briefings.

5.6. MINIMUM SAFETY REQUIREMENTS FOR CONTRACTORS

5.6.1. PERSONAL PROTECTIVE EQUIPMENT (PPE)

The items listed below are minimum requirements for personnel entering or working within a Railroad corridor. Additional PPE, i.e. respiratory protection, hand protection, electrical protection, face protection, etc... may be required depending on the type of work being performed. All PPE shall conform to OSHA and Railroad standards and requirements.

- 4 point minimum suspension hard hat
- Steel toe boots with ankle protection
- Proper rated safety glasses
- High visibility reflective clothing
- Proper rated ear protection

Company specific safety requirements are provided as part of the Contractor's Right of Entry Agreements.

5.7. CONSTRUCTION SUBMITTALS

Bridge Demolition and Removal Plans

On projects that include the removal of existing highway structures, the contractor is responsible to submit a demolition and removal plan in accordance with UPRR's [Guidelines for Preparation of a Bridge Demolition and Removal Plan for Structures over Railroads.](#)



Guidelines for Temporary Shoring

If required as part of the planned construction, the contractor is responsible for the design, construction and performance of temporary structures and shoring in compliance with BNSF/UPRR [Guidelines for Temporary Shoring](#).



Site Specific Safety Plans

If conditions at the site of the Railroad work warrants, the contractor may be required to provide a site specific safety plan for approval by UDOT and the Railroad. If environmental testing indicates the presence of hazardous contaminants in soils to be excavated as part of the project, a Health and Safety Plan (HASP) will be required.



5.8. CONSTRUCTION FORMS

Construction forms may be found at the [UDOT Construction Forms](#) website.

(Refer to [Minimum Sampling and Testing Requirements](#) for materials acceptance and documentation requirements and forms)

Refer to the UDOT Construction Manual of Instruction for a full list of all construction forms and documents to be completed as needed for each construction project. Form [C193](#) and [C193A](#) will most likely need to be completed for all Crossing projects. The [C118](#) form may need to be completed if overrun funding is required.

5.9. RAILROAD RESPONSIBILITIES DURING CONSTRUCTION

During the course of construction, and at periods prior, the Railroad representative will need to participate in several project and construction related activities.

- Attend project preconstruction meeting.
- Attend necessary weekly construction meetings in order to understand upcoming tasks being performed on the project and how they may impact the Railroad and the project.
- Maintain contact with the project contractor and the UDOT RE throughout the Railroads involvement on the project. Topics to discuss may include but are not limited to:
 - Work activities
 - Schedule
 - Foreseeable setbacks or time constraints
 - Safety practices for all personnel operating around the rail corridor
- Conduct daily and shift safety briefings including all Railroad personnel and any highway construction personnel that may be impacting the rail corridor during their daily activities.

Obtain and maintain all proper permits and fees associated with the rail work, including Form B permits and entry permits.

5.10. RAILROAD PERFORMED WORK

When a UPRR crossing is installed or modified as part of a Highway Improvement or Safety Improvement Project, the track, surface and signal installation work is typically completed by the UPRR or by contractors procured by the UPRR. UDOT reimburses the Railroad for 100 percent of the cost of the work based on actual costs determined upon completion. Federal regulations give strict guidelines on what costs are reimbursable. Other reimbursable Railroad work includes preliminary engineering, inspection, flagging and administrative costs. More information about reimbursable work is included in 23 CFR 646.

UTA and other railroads' Crossing installations or modifications are typically completed as part of UDOT's contract.

5.11. UDOT RESIDENT ENGINEER RESPONSIBILITIES

The UDOT RE is responsible to be familiar with and enforce the provisions of the UDOT Standard Specifications, Special Provisions and agreements with the Railroad(s) during the duration of the project. Copies of the Railroad agreements, approved contractor's right of entry agreements, demolition plans, shoring plans, etc. must be on file in the project office. The UDOT RE will ensure that the contractor is providing the proper notification and holding the required meetings with the Railroad representatives, and to ensure that all appropriate safety measures are in place during the work.

As with all contract work that is completed on a force account, actual cost basis, the UDOT RE or his/her representative is required to keep daily records of the labor, materials and equipment used by the Railroad in the completion of the work to be kept on file in the project office. The UDOT RE should specifically note the date the work physically began and the date the work was completed. The requirement for daily record keeping also applies to Railroad flagging, inspection and cleanup work as well as actual construction work performed by Railroad forces on Crossing installations and modifications.

If there is a change in the scope of the Railroad work required on the project, a Change Order to the executed agreement should be prepared. Utility Change Orders are completed in PDBS, and a UCOFN is prepared to fund the cost of additional work, if applicable.

Resident Engineer Responsibilities

The UDOT RE is responsible to keep Daily Force Account Records of work accomplished on the project, verify that the work represented by the billing has been completed, and approve the billing for payment.

The UDOT RE is not expected to document reimbursable Railroad work that takes place off site such as engineering review, real estate costs, signal system assembly, etc., nor to perform a detailed audit of the billing.

CHAPTER 6:

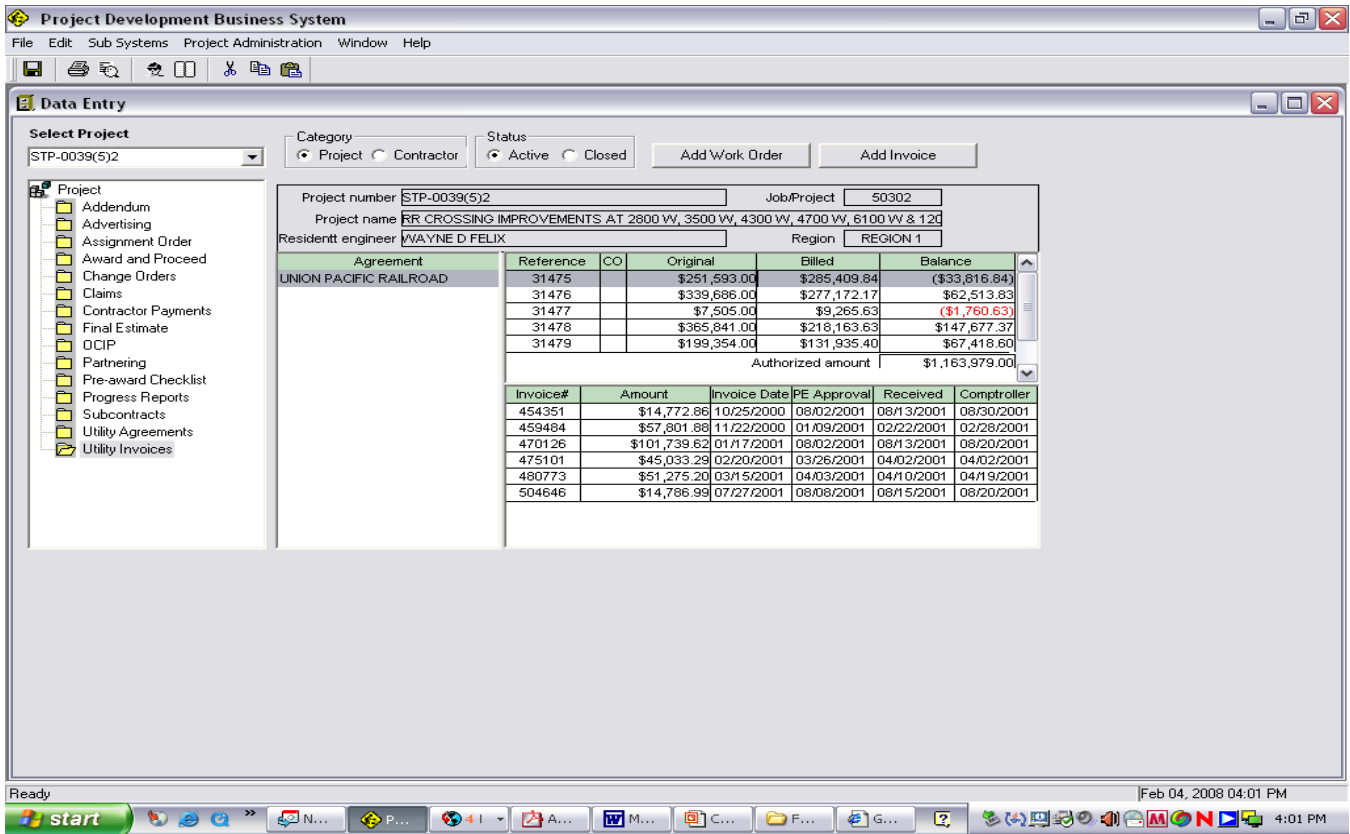
PROJECT BILLING AND CLOSEOUT

Railroads are instructed to submit billings for work on projects, including supporting documentation, to UDOT's Contracts and Compliance Specialist in the Construction Office at the Calvin Rampton Complex. The Contracts and Compliance Specialist will log the billings into PDBS under Utility Invoices referencing the Agreement Finance Number and forward copies of the billing to the appropriate UDOT Resident Engineer (RE) for review and authorization for payment. Transmittal of billings is typically done electronically to speed processing of the billings. Billings for Railroad flagging, inspection, and force account work may be submitted progressively, or may be submitted as one final billing upon completion of the work on the project. Railroads are requested to submit progressive billings within 30 days and final billings within 6 months of the completion of the work on the project. In accordance with federal requirements, billings submitted past one year of completion of railroad work may result in the disallowance of payment unless otherwise agreed to by the parties in advance.

The UDOT RE is responsible to keep Daily Force Account Records of work accomplished by railroad companies on the project, verify that the work represented by the billing has been completed, and approve the billing for payment. Authorization for payment, in the form of a signed cover letter or statement on the billing form, should be returned to the Contracts and Compliance Specialist who will enter the payment into PDBS and forward the billing to the Comptroller's Office for payment. Payment will be made within 60 days of UDOT's receipt of the billings. The UDOT RE is not expected to document reimbursable Railroad work that takes place off site such as engineering review, real estate costs, signal system assembly, etc., nor to perform a detailed audit of the billing. It should be assumed that these costs were incurred in support of the project during preconstruction, prior to the physical work on the project site being

If the UDOT RE has legitimate concerns with the costs represented in the billings, the costs in question should be identified and withheld from the authorized for payment amount, and the verifiable amount of the billing should be approved for payment. A detailed explanation of the disallowed work and cost should be provided to the Railroad and the Contracts and Compliance Specialist, who will forward the billing to internal audit for review and recommendation. Should internal audit determine that the costs are eligible for reimbursement; the UDOT RE will authorize the additional costs for payment based on that determination.

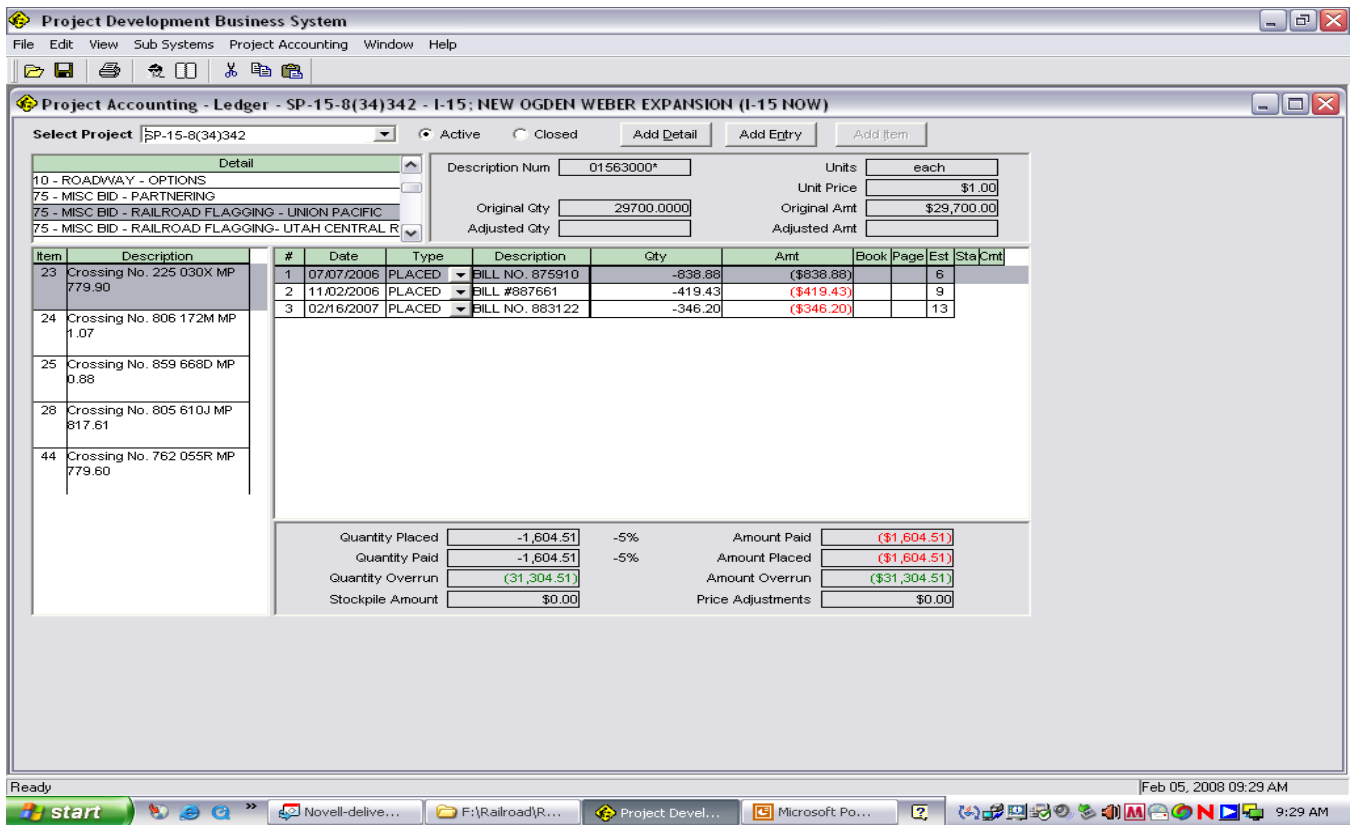
completed. If the UDOT RE has any questions about preconstruction or other costs reflected on the billings, they should confer with the Region Utility and Railroad Leader or Coordinator for clarification. A detailed audit of all costs represented in the billings will be performed by UDOT's Internal Audit section before final payment to the Railroad is made.



In accordance with Standard Specification 00725 Scope of Work, 1.15 Railway Highway Provisions, upon verification and payment of billings, the UDOT RE will deduct payment for Railroad flagging, inspection and cleanup from the contractor's pay estimate under a construction accounting item for "Railroad Flagging, Inspection and Cleanup". The UDOT RE establishes this line item by selecting it from the pull down menu in the Add a Detail option in PDBS.

Standard Specification 00725, Railway-Highway Provisions

- B. The Department does not reimburse for railroad flagging and inspection.**
- F. Determine the cost of required railroad flagging, inspection, and cleanup crew. Include these costs in mobilization. No other compensation is allowed.**
 - 1. The Department deducts payment under a construction accounting item for "Railroad Flagging, Inspection, and Cleanup" and pays the railroad directly for verified billings.**



Costs for preliminary engineering review, real estate fees, and construction work performed by Railroads or their contractors are 100 percent UDOT costs and are not back charged to the contractor.

Railroad Flagging and Safety Oversight

It is particularly important that the UDOT RE monitor and document the reimbursable work being performed on behalf of the contractor, including the scheduling of Railroad flagging, to ensure that the worksite is safe and that the contractor understands how flagging costs are billed against the project.

It is particularly important that the UDOT RE monitor and document the reimbursable work being performed on behalf of the contractor, including the scheduling of Railroad flagging, to ensure that the worksite is safe and that the contractor understands how flagging costs are billed against the project. It is also important to make the appropriate deductions in a timely manner during the completion of the work. If progressive billings are being received, it's not recommended to accumulate the costs until the end of the project. In any case, deductions should be anticipated to ensure that adequate retention is available to withhold the contractor's share of Railroad costs before the final estimate is processed.

It is acceptable to allow contractors to review and comment on Railroad billings that will be withheld from their pay estimates, but it is responsibility of the UDOT RE to document and determine the appropriateness of the billings. The contractor should not be allowed to refuse payment for flagging costs incurred due to poor or inadequate planning and scheduling, nor to perform work within the proximity of tracks without flagging protection for the purpose of lowering their costs.

If at any time the total amount of the verified billings exceeds the estimated amount of the original executed agreement without a change in the scope of work, the UDOT RE will be notified and a Utility Cost Overrun Funding Need (UCOFN) must be prepared to explain the overrun and appropriate additional funds to the agreement.

Upon receipt of the Railroad's final billing for the project, the UDOT RE will verify the billing, complete Form C-193, Utility Fiscal Review Report, and C-193A, Salvage Credit Review Report for Utilities and Railroads, and forward the billing along with the daily force account records, to the Contracts and Compliance Specialist for payment and forwarding to internal audit for review and concurrence. Railroads are required to maintain records for the work performed on projects for a period of three years from the date final payment was received by the company to allow audit by UDOT and FHWA. Upon completion of the audit, internal audit will issue a report indicating the allowable amount of the actual costs incurred by the Railroad or the amount disallowed for payment under the requirements of 23 CFR 646. If the audit discloses that the Railroad has been overpaid, they are required to reimburse UDOT of the cost of the overpayment. If the Railroad has been underpaid, UDOT will reimburse the additional amount of the underpayment.

UDOT Construction Forms

UDOT Form C-118U, Utility Cost Overrun Funding Need; Form C-193, Utility Fiscal Review Report and Form C-193A, Salvage Credit Review Report for Utilities and Railroads, are available on UDOT's website at [Construction Contract docs](#).

CHAPTER 7:

UTILITY ENCROACHMENTS IN RAILROAD RIGHTS-OF-WAY

7.1. UTAH TRANSIT AUTHORITY

UTA requires individuals or companies to obtain a License for installation of wirelines, pipelines or other encumbrances on UTA property. Information including the Application, Procedures and Fee Schedule is located on UTA's [Property Management Website](#). Additional information on Insurance Requirements, Right of Entry and Safety Training Requirements is also provided.

7.2. UNION PACIFIC RAILROAD COMPANY

Anytime a new UDOT facility such as a storm drain, ATMS System, etc. is to be permanently installed or relocated across UPRR Property, an application for wireline or pipeline crossing must be prepared and submitted to UPRR for review and approval in UDOT's name. The proposed installation must meet all applicable UPRR specifications UPRR prepares the wireline or pipeline agreement for execution by UDOT. Since contractor right of entry agreements are no longer required by UPRR for most wireline and pipeline installations, payment of the applicable fees and proof of insurance must be provided by the owner of the facility in order for UPRR to execute the agreement.

Any third party utilities being installed or relocated as the result of a highway improvement project must obtain wireline or pipeline agreements with UPRR in their own name, including payment of fees and proof of insurance.

Complete instructions for making application for encroachments, wireline or pipeline crossings of UPRR ROW are available on their website at [UPRR Utilities Installations](#)

[UPRR Wireline Installation Engineering Specifications](#)

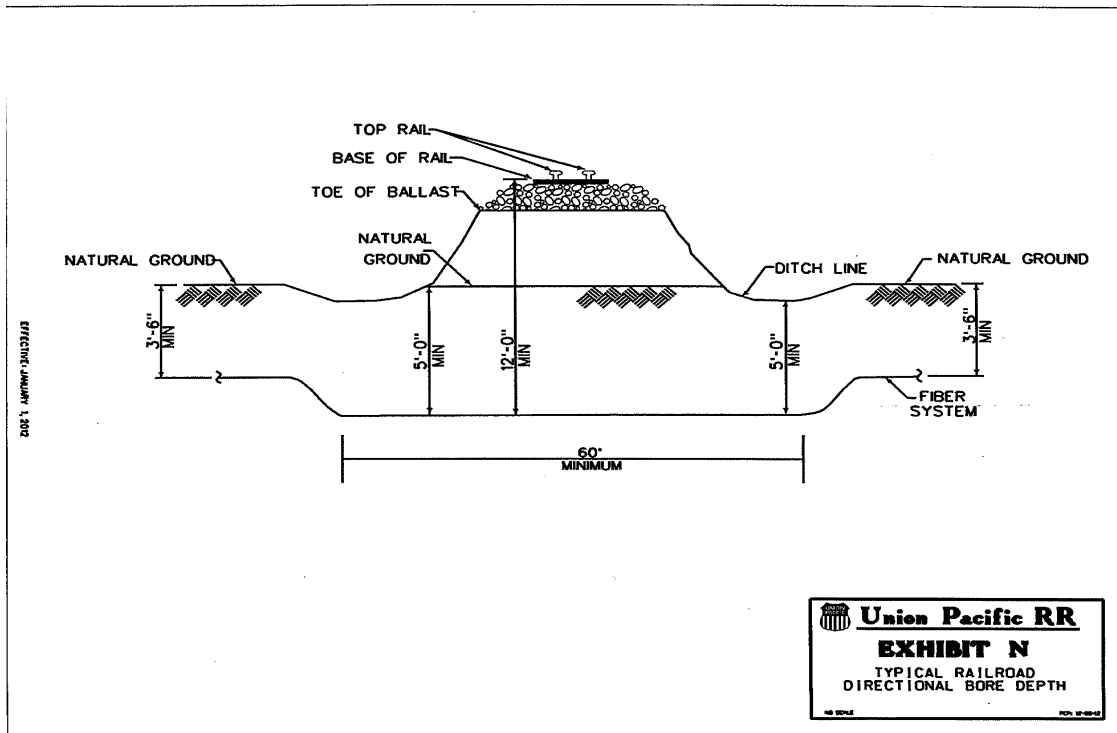
[UPRR Pipeline Installation Engineering Specifications](#)

Crossing vs. Encroachment

A Crossing is a pipeline or wireline that enters the railroad company's trackage from one side of the right of way to the other side of the right of way in as near a straight line as possible.

An Encroachment is a pipeline or wireline that enters the railroad company's right of way and either does not leave the right of way or follows along the right of way for some distance.

Installations by directional drilling must meet certain requirements and are subject to approval by UPRR. Please refer to the [Interim Guidelines for Horizontal Directional Drilling \(HDD\) Under Union Pacific Railroad Right of Way](#).



CHAPTER 8: MAINTENANCE COORDINATION

8.1. MAINTENANCE RESPONSIBILITIES

[Utah Administrative Rule R930-5](#) establishes maintenance responsibilities for the appurtenances associated with Crossings unless a separate agreement applies. Those responsibilities are:

- The Railroad is responsible for the maintenance of all Railroad passive and active warning devices within the Railroad ROW.
- If the Railroad has a property interest in the ROW, the Railroad is responsible for the maintenance of Crossing material within the Railroad ROW and two feet beyond each outside rail for Crossings without concrete Crossing panels or edge of concrete Crossing panel.
- On a temporary Highway detour Crossing, the Railroad shall be responsible for the maintenance of pavement, and passive and active warning devices within the Railroad ROW at expense of the Highway Authority.



- When the Railroad alters the railway due to track and ballast maintenance, the Railroad shall coordinate their work with the Highway Authority so the pavement approaches can be adjusted to provide a smooth and level Crossing surface.
- When the Highway Authority changes the Highway profile, through construction or maintenance activities, the Highway Authority shall coordinate their work with the Railroad so the tracks can be adjusted to provide as smooth and level a Crossing surface as possible.

- Where a Highway structure overpasses a Railroad, the Highway Authority is responsible for the maintenance of the entire structure and its approaches.
- Where a Highway underpasses a Railroad and the Railroad owns the ROW in fee title, the Highway Authority is responsible for the maintenance of the Highway and the entire structure below and including the deck plate, girders, handrail, and parapets. The Railroad is responsible for the maintenance of the ballast, ties, rails and any portion of the supporting structure above the top of the ballast deck plate between parapets.
 - If the Highway Authority owns the ROW in fee title, the Railroad is responsible for the maintenance of the entire structure unless a separate agreement applies.
 - Cost of repairing damages to a Highway or a Highway structure, occasioned by collision, equipment failure, or derailment of the Railroads equipment shall be borne by the Railroad.
- Responsibility for maintenance of private industrial trackage not owned by a Railroad that crosses a Highway shall be as follows:
 - When a facility, plant, or property owner receives goods and services from a Railroad over private industrial trackage that crosses a Highway, maintenance of the Crossing shall be the responsibility of the industry owning the trackage, or as agreed to by the parties.
 - When the Crossing becomes a safety hazard to vehicles and is not maintained, UDOT and/or the Railroad shipping the goods and services shall notify the industry owning the trackage in writing to maintain or replace the Crossing material.
 - If the industry owning the trackage does not maintain or replace the Crossing material by a specified date, UDOT shall order the Railroad to cease operations across the Crossing.
 - If the industry owning the trackage does not respond to the order to maintain or replace the Crossing material UDOT shall arrange to have the Crossing material replaced and bill the industry owning the trackage for the expenses to repair the trackage.



8.1.1. RAILROAD CONTACTS

Following are the Railroad points of contact for maintenance related issues:

Bill Ince Union Pacific Railroad 801-212-3939 billince@up.com	Troy Nelson UTA 801-236-3666 (Office) 801-514-7450 tnelson@rideuta.com	Scott Cox Utah Railway 801-367-1814 scox@gwrr.com
Maurice Bowens Utah Central Railway 801-732-8906 mbowens@ucry.net	Chris Weesner Salt Lake Garfield & Western Railway 801-322-3429 slgwchris@yahoo.com	Mark Nelson Heber Valley Railroad 435-654-5601 mark@hebervalleyrr.org

8.2. EMERGENCY MANAGEMENT

In the event of an incident at a Railroad Crossing, police and emergency officials should be notified immediately if the incident has already or has the potential to pose a risk to the traveling public. Call 911.



8.2.1. RAILROAD EMERGENCY CONTACTS

List of Railroad emergency contacts to report Crossing blockages and unsafe conditions:

<u>AMTRAK</u>	<u>1-800-331-0008</u>
<u>BNSF</u>	<u>1-800-832-5452</u>
<u>Heber Valley Railroad</u>	<u>1-435-654-5601</u>
<u>Salt Lake, Garfield and Western Railway</u>	<u>1-801-322-3429</u>
<u>Union Pacific Railroad</u>	<u>1-888-877-7267</u>
<u>Utah Central Railway</u>	<u>1-801-732-8906</u>
<u>Utah Railway</u>	<u>1-801-372-1545</u>
<u>UTA FrontRunner</u>	<u>1-801-287-5455</u>
<u>UTA TRAX</u>	<u>1-801-352-6700</u>
<u>Savage Bingham and Garfield Railroad</u>	<u>Contact UTA</u>

APPENDIXES

X1. Example Theoretical Structure Cost Estimate for Railroad
5 Percent Participation Calculation p 43

Item	Description	Units	Quantity	Unit Price	Original Amount (5 Lanes)	Adjusted Amount (3 Lanes)
Construction Costs						
10	Borrow (Plan Quantity)	CY	160,000	\$7.00	\$1,120,000.00	\$840,000.00
12	Embankment for Bridge	CY	20,000	\$18.00	\$360,000.00	\$270,000.00
13	Settlement Platforms	EA	10	\$1,800.00	\$18,000.00	\$13,500.00
33	Roadway Excavation (Plan Quantity)	CY		\$7.00	\$0.00	\$0.00
	Roadway Excavation (37' Wide Road - 24" Thick)	LF	1,000	\$19.00	\$19,000.00	\$19,000.00
	Roadway Excavation (62' Wide Road - 24" Thick)	LF	1,900	\$32.00	\$60,800.00	\$60,800.00
35	Surcharge (Plan Quantity)	SY	18,000	\$7.00	\$126,000.00	\$94,500.00
37	Prefabricated Vertical Wick Drains	LS	1	\$500,000.00	\$500,000.00	\$375,000.00
64	Approach Slab Catch Basin	EA	6	\$2,200.00	\$13,200.00	\$13,200.00
81	Untreated Base Coarse (Plan Quantity)	CY		\$28.00	\$0.00	\$0.00
	Untreated Base Coarse (37' Wide Road - 8" Thick)	LF	1,000	\$26.00	\$26,000.00	\$26,000.00
82	HMA - 3/4 inch	TON		\$80.00	\$0.00	\$0.00
	HMA - 3/4 inch (37' Wide Road - 4" Thick)	LF	1,000	\$55.00	\$55,000.00	\$55,000.00
94	Concrete Curb and Gutter Type B1	LF	2,000	\$15.00	\$30,000.00	\$30,000.00
101	Concrete Sidewalk	SY		\$40.00	\$0.00	\$0.00
	Concrete Sidewalk (6' Sidewalk - 6" Thick)	LF	1,000	\$27.00	\$27,000.00	\$27,000.00
117	Granular Borrow Backfill (Plan Quantity)	CY	305	\$23.00	\$7,015.00	\$5,261.25
118	Pile Driving Equipment	LS	1	\$30,000.00	\$30,000.00	\$30,000.00
119	Driven Piles 16 inch	LF	4,225	\$85.00	\$359,125.00	\$269,343.75
120	Walkway Chainlink Fence, Type II	LF	240	\$20.00	\$4,800.00	\$4,800.00
121	7 ft Chain Link Fence, Type II	LF	240	\$17.10	\$4,104.00	\$4,104.00
122	Precast Substructure Elements	LS	1	\$320,000.00	\$320,000.00	\$240,000.00
123	Precast Approach Slabs (Est. Lump Qty: 5700 sq ft)	LS	1	\$285,000.00	\$285,000.00	\$213,750.00
124	Reinforcing Steel - Coated (Plan Quantity)	LB	15,000	\$0.96	\$14,400.00	\$10,800.00
125	Structural Concrete (Est. Lump Qty: 100 cu yd)	LS	1	\$60,000.00	\$60,000.00	\$45,000.00
126	Precast Concrete Deck Panel (Est. Lump Qty: 15580 sq ft)	LS	1	\$779,000.00	\$779,000.00	\$584,250.00
127	Thin Bonded Polymer Overlay, Type 1	SF	20,600	\$6.00	\$123,600.00	\$92,700.00
128	Structural Steel (Est. Lump Qty: 900100 lb)	LS	1	\$1,710,200.00	\$1,710,200.00	\$1,282,650.00
129	Electrical Work Bridges	LS	1	\$10,000.00	\$10,000.00	\$10,000.00
138	Concrete Gutter	LF	3,000	\$40.00	\$120,000.00	\$120,000.00
139	MSE Retaining Wall R- A (Est. Exposed Surface Area: 25,500 sq ft)	LS	1	\$2,040,000.00	\$2,040,000.00	\$2,040,000.00
140	MSE Retaining Wall R- A (Est. Exposed Surface Area: 25,500 sq ft)	LS	1	\$2,040,000.00	\$2,040,000.00	\$2,040,000.00
	Subtotal Construction Costs					\$8,816,659.00
	Mobilization (10% of Construction Costs)					\$881,665.90
	Traffic Control (7%)					\$617,166.13
	PE (8%)					\$705,332.72
	CE (8%)					\$705,332.72
	Contingency (10%)					\$881,665.90
	Total Construction Costs					\$12,607,822.37
Railroad Reimbursable Costs						
	Union Pacific Railroad Company (Flagging Protection & Engineering Costs)					\$210,000.00
	Utah Transit Authority (Flagging Protection, Engineering & Xing Removal Cost)					\$250,000.00
	Total Railroad Company Costs					\$460,000.00
Right of Way Costs						
	Right of Way	SF	51,200	\$5.00	\$256,000.00	\$256,000.00
	Right of Way (Property Take with Building)	EA	4	\$200,000.00	\$800,000.00	\$800,000.00
	Right of Way (Property Take without Building)	EA	1	\$100,000.00	\$100,000.00	\$100,000.00
	Total Right of Way Costs					\$1,056,000.00
Utility Relocation Costs						
	Questar (Adjusting Utilities)	LS	1	\$335,276.00	\$335,276.00	\$335,276.00
	Qwest (Adjusting Utilities)	LS	1	\$100,000.00	\$100,000.00	\$100,000.00
	Pacificorp DBA Rocky Mountain Power (Adjusting Utilities) Distribution Line	LS	1	\$100,000.00	\$100,000.00	\$100,000.00
	Questar (Adjusting Utilities)	LS	1	\$100,000.00	\$100,000.00	\$100,000.00
	Comcast (Adjusting Utilities)	LS	1	\$1,800.00	\$1,800.00	\$1,800.00
	Clearfield City Culinary Water Relocation	LS	1	\$847,835.00	\$847,835.00	\$847,835.00
	Clearfield City Sanitary Sewer Relocation	LS	1	\$1,034,605.00	\$1,034,605.00	\$1,034,605.00
	Clearfield City Storm Drain Relocation	LS	1	\$1,296,725.00	\$1,296,725.00	\$1,296,725.00
	Clearfield City Irrigation Relocation	LS	1	\$1,072,615.00	\$1,072,615.00	\$1,072,615.00
	Total Utility Relocation Costs					\$4,888,856.00
Miscellaneous Costs						
	Total Miscellaneous Costs					
	Total Theoretical Three Lane Structure Cost					\$19,012,678.37

Unit Abbreviations

LS = Lump Sum
 LB = Pounds
 SF = Square Feet
 LF = Linear Foot
 CY = Cubic Yards
 EA = Each

UTA Share 1.5% \$285,190.18
 UPRR Share 3.5% \$665,443.74
 \$950,633.92

Notes

Cost figures stated above are based on the UDOT PDBS "Engineer's Estimate (Innovative Contracting)" for the SR-193 Extension project. These figures have been pro-rated from a 5 lane road (SR-193 86' wide) to a 3 lane road (700 South 62' wide) being approximately 75% of the cost. UTA is responsible for it's portion based on the ratio of UTA right-of-way (26') to UPRR right-of-way (74') being 26% of the total right-of-way being crossed. UTA is therefore responsible for 26% of 5% being 1.5%.

X2. UDOT UPRR Master Agreement for At Grade Crossing Safety Improvement Projects

Dated March 6, 2013 P 48

138565

Master Agreement
Grade Crossing Safety Improvement Projects

UNION PACIFIC RAILROAD COMPANY

18190

UPRR Audit Number: _____

Folder # 279070

MASTER AGREEMENT

BETWEEN THE

UTAH DEPARTMENT OF TRANSPORTATION

AND

UNION PACIFIC RAILROAD COMPANY

COVERING

GRADE CROSSING SAFETY IMPROVEMENT PROJECTS

IN THE

STATE OF UTAH

MASTER AGREEMENT

THIS MASTER AGREEMENT ("Agreement"), made and entered into this 6 day of March, 2013 (the "Effective Date"), by and between the **UTAH DEPARTMENT OF TRANSPORTATION ("UDOT")** and **UNION PACIFIC RAILROAD COMPANY**, a Delaware corporation ("**Railroad**").

RECITALS:

WHEREAS, UDOT, with the aid of federal railroad safety funds supplied by the Federal Government, desires to provide for the improvement, installation, maintenance, and operation of active or passive grade crossing warning devices of various descriptions, including protective guardrails, impact attenuators bells, gates, flashing lights (hereinafter called "warning devices"), grade crossing surface improvements, illumination, pavement markings, advance warning signs, interim traffic control measures, or any combination thereof, at public highway and street grade crossings over the **Railroad's** track or tracks at various locations in the State of Utah.

In order to expedite the processing of applications for the installation or improvement of said facilities and the preparation of agreements therefore as required, it is the desire of the parties hereto to enter into a Master Agreement setting out the general terms and conditions under which said facilities shall be provided, with the understanding that supplements to this agreement will be issued covering specific individual projects.

AGREEMENT

IT IS AGREED, by and between the parties hereto, as follows:

1. **SUPERSEDES PREVIOUS BLANKET AGREEMENTS, FORM OF SUPPLEMENTAL:**

It is understood and agreed by the parties hereto that this agreement will supersede the Blanket Agreement Covering Grade Crossing Warning Devices and/or Grade Crossing Surface Improvements in Utah dated December 23, 1987, UDOT Finance No. 88 2153, Railroad L.D. No. 26588 and supplements thereto.

The parties incorporate by reference 23 CFR 140, subpart I and 23 CFR 646, subpart B.

The form of the Supplemental to be prepared by UDOT and submitted to Railroad for each specific individual project shall be in the form marked as Exhibit A, attached hereto and incorporated by reference.

2. RAILROAD COMPANY TO MAKE INSTALLATIONS:

The **Railroad** shall, at the expense of **UDOT**, furnish all necessary labor, material, flagmen and equipment and shall install warning devices and/or surface improvements of the type and at the locations on the **Railroad's** right-of-way described in future supplements hereto, subject to the terms and conditions hereinafter set forth.

The **Railroad** shall also furnish, at the expense of **UDOT**, such detailed plans, specifications, lists of material and estimates of cost which may be required in addition to those prepared by **UDOT**. Said plans, specifications, lists and estimates shall become, by reference, a part of each supplement that may be issued hereunder.

The position of the warning devices, advance warning signs, protective guardrails and the location, width of grade crossing materials, and the adjustment of tracks, warning signs and other appurtenances at any particular crossing shall be established jointly by representatives of **UDOT** and the **Railroad** in accordance with the "Manual on Uniform Traffic Control Devices (MUTCD)". The **Railroad** will not begin installation of the warning devices or surface improvements until authorization is received from **UDOT**.

3. PRIOR NOTIFICATION OF WORK:

On all projects where work is performed on an actual cost basis:

A. The **Railroad** will provide forty-eight (48) hours notice, exclusive of weekends and holidays, to **UDOT's** Resident Engineer's office before performing any work covered by this agreement and any supplements hereof. If the **Railroad** experiences emergency work of its own which interrupts work on the project, it will resolve said emergency and notify the Resident Engineer's office when work will be resumed on the project. Failure of the **Railroad** to give proper notification to **UDOT's** Resident Engineer's office may result in **UDOT's** disallowance of reimbursement for that portion of the **Railroad's** unsupervised work.

B. **UDOT**, through its Resident Engineer, will keep daily records of the work performed by the **Railroad** in duplicate on a mutually acceptable form. The daily record shall be signed by **UDOT's** Resident Engineer and the **Railroad's** authorized representative. Each party shall be provided a copy of the record. When emergencies require the **Railroad's** work forces to leave a project, the record shall be resumed when work on the highway project is again commenced.

C. Before commencing any construction or other substantial work contemplated by this agreement, **UDOT** shall notify the **Railroad** of the time when such work shall commence. Notice shall be given not less than forty-eight (48) hours, exclusive of weekends and holidays, prior to the time work is to commence. **UDOT** shall cooperate with the **Railroad** in every reasonable way for the adequate protection of the **Railroad's** facilities and operations during progress of the work.

D. On projects where the work can be accurately estimated and **UDOT** and the **Railroad** have agreed to Lump Sum Payment as described in 23 CFR 140 Subpart I & 646 subpart B, there will be no requirement for daily record keeping nor for audit and reimbursement shall be made in conformance with Section 6 of this agreement. However, prior notification shall remain as in A and C above.

4. MATERIALS USED IN WARNING DEVICES AND SURFACE IMPROVEMENTS:

All materials used for warning devices and surface improvements shall be purchased by the **Railroad** or furnished by the **Railroad** from its company stock in accordance with the provisions of 23 CFR 140.908, Materials and Supplies and any amendments thereto which are in effect at the time of the execution of each supplement hereto.

Railroad acknowledges that this Agreement covers federal-aid projects, and Union Pacific will comply with the requirements of U.S.C. Section 313 and 23 CFR Section 635.410, Buy America requirements.

5. STATE TO REIMBURSE RAILROAD COMPANY:

A. For work performed by the **Railroad** on a reimbursement for Actual Cost basis, **UDOT** will pay the **Railroad** as follows:

- 1) **UDOT** shall pay to the **Railroad**, within forty-five (45) days (one hundred twenty (120) days for final billing) from receipt of the invoice the actual cost incurred by the **Railroad** in carrying out the work to be performed by the **Railroad** under the provisions of this Agreement and each supplement hereto. The invoice shall be prepared in conformity with 23 CFR 140.922. Said invoice shall be submitted by the **Railroad** within ninety days (90) days after the completion of the work performed by the **Railroad**. The **Railroad** shall send the invoices to Chief Railroad Engineer, UDOT Traffic and Safety, PO Box 143200, Salt Lake City, Utah 84114-3200. All final bills rendered by the **Railroad** and paid by **UDOT** will be subject to audit and approval by the Federal Highway Administration. Progress payments shall be made to the **Railroad** on Bills rendered by the **Railroad** during the progress of the work. All bills shall be reviewed by **UDOT's** Resident Engineer for verification of the work performed. Any work performed without proper notification to **UDOT's** Resident Engineers and for which Federal Funding is denied as a direct result of failure to provide prior notification shall be cited to the **Railroad** and deducted from the reimbursement.
- 2) Reimbursements will be made only for items fully complying with the requirements of 23 CFR 646 subpart B and 23 CFR 140 subpart I and any amendments thereto which are in effect at the time of the execution of each supplement hereto. Rental rates for any items of equipment necessary to the job and not included in the standard rates bulletin will be established with advance approval by the parties.
- 3) Reference to the Federal-Aid Grade Crossing Project Number will be indicated on all bills, correspondence and records pertaining to the project.

B. For work performed by the **Railroad** on a Lump Sum basis, **UDOT** will pay the **Railroad** as follows:

- 1) **UDOT** agrees to pay the **Railroad** a lump sum for the work performed on a project that has been undertaken as a lump sum project in accordance with the provisions of 23 CFR 140 Subpart I and 23 CFR 646.216(d)(3) and any supplements thereto, incorporated herein by reference and made a part hereof. The lump sum price for the work to be performed by the **Railroad** will be provided on a per-crossing basis, using the form of detailed estimate provided as Attachment 2 to FAPG NS 23 CFR 646B, after approval by **UDOT** and the Federal Highway Administration of the final detailed plans submitted by the **Railroad**. After obtaining the necessary approvals, completion of the work and the invoice for the lump sum, **UDOT** shall pay the lump sum invoice within forty-five (45) days from receipt of the invoice. **UDOT** may accept the **Railroad's** proposal (as indicated in the detailed estimate) to perform the work on a lump sum basis at any time within ninety (90) days of receipt of the detailed estimate. If the proposal submitted by the **Railroad** is not accepted by **UDOT** and Federal Highway Administration within ninety (90) days, the proposal shall be considered withdrawn and the **Railroad** may, at its sole option, submit a new proposal in the form of a detailed estimate to perform the work on a lump sum basis subject to acceptance by **UDOT** for ninety (90) days or extend the time within which **UDOT** may accept the original proposal. **UDOT** may accept the **Railroad's** proposal to perform the work on a lump sum basis by forwarding the **Railroad** an addendum to this Master Agreement for execution by **Railroad** officials and a written authorization for the **Railroad** to proceed with the work. If lump sum basis is used, **UDOT** will perform periodic reviews and analyses of the railroad's methods and cost data used to develop lump sum estimates.
- 2) If by some unforeseen circumstance **Railroad** flagging and inspection should exceed the detailed estimate by 20% they shall be covered by a supplement to the addendum for the lump sum agreement.
- 3) The **Railroad** shall, upon completion of the work covered in the lump sum agreement, render to **UDOT** a statement for the total lump sum amount shown in the addendum to this Master Agreement.
- 4) Reimbursement by **UDOT** of the lump sum price shall be made within forty-five (45) days of receipt of the **Railroad's** statement.

6. MAINTENANCE AND OPERATION OF WARNING DEVICES:

Upon completion of the warning device installation at any particular grade crossing, the **Railroad**, at its own expense (except as herein or in any future supplement otherwise provided), shall thereafter operate and maintain said warning devices in proper working condition; PROVIDED, HOWEVER, that this provision shall not negate the **Railroad's** eligibility for any further federal, state or local or other public funds that may become available for the maintenance of said devices

If said warning devices or their appurtenances installed under any supplement to this agreement are damaged, and if after a diligent effort by the **Railroad**, documented in writing, the item for damages proves uncollectible from the person or persons responsible for such damage, or in the event the **Railroad** and **UDOT** agree that Said warning devices, because of age, cannot be

maintained or by virtue of their obsolescence require replacement, then in either event the apportionment of the cost to repair or replace the warning devices shall be negotiated by the parties.

UDOT will not assume any liability for further damage or participate in any flagging or other costs on account of the warning devices being inoperative due to damage or replacement. If the damage to said warning devices is caused by highway traffic, **UDOT** will cooperate with the **Railroad** in determining the location and identification of the parties responsible for such damage to the extent of making accident records available to the **Railroad**.

7. MOVING AND RELOCATION:

If for public or **Railroad** convenience, the rearrangement of any warning device is necessitated on account of improvements for either railroad, highway, or both, and before rearrangement of said warning device is undertaken, the apportionment of the expense incidental thereto shall be determined by agreement.

8. MAINTENANCE AND OPERATION OF CROSSING SURFACE IMPROVEMENTS:

Upon completion of a Project, **Railroad** hereby assumes all responsibility for the Railroad Work it has agreed to perform. The **Railroad** will remain the owner of the facilities constructed by the Railroad under this Agreement, and will thereafter, at no cost to **UDOT** or jurisdictional authority, maintain the crossing material within the railroad right-of-way and two feet beyond each outside rail for crossings without concrete crossing panels or edge of concrete crossing panel. **Railroad** will not be responsible for maintenance of **UDOT's** or jurisdictional authority's facilities including, without limitation, the portions of the Road Crossing that are located beyond the area described above.

9. DRAINAGE:

If roadway approach paving work is included as part of the Railroad Crossing Project **UDOT** will, at its expense, design and install adequate facilities for draining the highway and its appurtenances, and shall not obstruct or interfere with existing drainage facilities or suffer or permit drainage water to flow or collect upon property of the **Railroad** because of any facilities or work of **UDOT**, and shall provide adequate passageway for the waters of any streams, bodies of water and drainage facilities (either natural or artificial, and including water from the **Railroad's** culvert and drainage facilities), so that water may not be impeded, obstructed, diverted or caused to back up, overflow or damage the property of the **Railroad** or any part thereof, or the property of others.

10. INTERFERENCE WITH RAILROAD COMPANY OPERATIONS:

All work of **UDOT** contemplated by this agreement, including any work of maintenance of the highway facilities or appurtenances constructed on the **Railroad's** property shall be performed and accomplished without interruption to or delay of operations of the **Railroad** or of others lawfully occupying or using the property or facilities.

UDOT shall not do, suffer or permit anything which will or may obstruct, endanger, interfere with, hinder or delay maintenance or operation of the **Railroad's** tracks or facilities, or any communication or signal lines, installations or any appurtenances thereof.

11. INSTALLATION AND MAINTENANCE OF SIGNS, GUARDRAIL, PAVEMENT MARKINGS AND APPROACH PAVING:

Installation and maintenance of any advance warning signs, protective guardrails, pavement markings and approach paving that may be required in any particular project shall be performed by and at the expense of **UDOT** or the local authority having jurisdiction over the highway right-of-way.

12. CESSATION OF OPERATION:

If the warning devices and surface improvements at any crossing, the subject of this agreement or any future supplement hereto, are rendered unnecessary or undesirable, or improper by closing said crossing, by relocation, by separation of grades, or improvements in crossing protection, the **Railroad** shall be released from further maintenance and obligation in connection therewith.

In the event of cessation of operation of any warning devices under the above conditions, the salvable items shall be disposed of by agreement of the parties hereto prior to said cessation of operation. **UDOT** and/or the Federal Highway Administration shall have the right to inspect salvageable material prior to its disposal.

13. EACH PARTY RESPONSIBLE FOR ITS OWN ACTIONS:

The **Railroad** and **UDOT** each hereby assume all responsibility for the construction and maintenance work it has agreed to perform.

14. COMPLIANCE WITH FEDERAL-AID HIGHWAY PROGRAM:

Installation of warning devices or surface improvements as contemplated hereunder and Federal participation in the cost thereof shall be in accordance with the provisions of 23 CFR 646 , 23 CFR 140 subpart I, and the Federal Aid Program Guide NS 23 CFR 646B issued by the Federal Highway Administration, and any supplements or amendments thereto which are in effect at the time of the execution of each supplement hereto, which are incorporated herein by this reference.

In accordance with the provisions of 23 CFR 646.210(b), the **Railroad** will receive no ascertainable benefit from the installation of the warning devices or surface improvements and consequently no contribution from the **Railroad** will be required toward the cost thereof except as otherwise specifically provided in this Agreement, and any supplement hereto.

If the work by the **Railroad** under this agreement at any particular crossing is performed by other than **Railroad** forces or equipment, the provisions of the Civil Rights Act of 1964, contained in attached Appendix A, will apply and become a part of the supplement for that particular project.

15. EXTRA WORK:

Except as otherwise provided in Section 6 (b) for lump sum projects, in the event there are changes in the scope of the work, extra work, or changes in the planned work covered by this agreement, reimbursement therefore shall be limited to costs covered by a modification to this agreement approved in writing by **UDOT** prior to the start of work on the changes or additions.

16. INSURANCE, UDOT PERFORMED WORK:

On any railroad safety improvement project where **UDOT** will be performing any Work on **Railroad's** property with its own contractors, **UDOT** will require its contractor to enter into a Contractor's Right of Entry Agreement.

AT NO TIME SHALL EITHER PERSONNEL OR EQUIPMENT BE ON RAILROAD PROPERTY OUTSIDE OF PUBLIC RIGHT OF WAY, OR BE CLOSER THAN TWENTY FIVE (25) FEET TO THE RAILROAD'S TRACK WITHOUT THE PRESENCE OF A RAILROAD FLAGMAN.

17. PROTECTION OF FIBER OPTIC CABLE SYSTEMS:

Fiber optic cable systems may be buried on the **Railroad's** property. **UDOT** or its contractors shall telephone the **Railroad** at 1-800-336-9193 (a 24-hour number), to determine if fiber optic cable is buried anywhere on the **Railroad's** premises to be used by **UDOT**. If it is, **UDOT** will telephone the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the **Railroad's** premises.

18. INDEMNITY

A. In addition to the liability terms elsewhere in this Agreement, **UDOT** shall indemnify, defend and hold **Railroad** harmless against and from all third party costs, liability, and expenses whatsoever (including, without limitation, attorney fees, court costs, and expenses) arising out of any act or omission of **UDOT**, its **Contractor**, agents and/or employees, that causes or contributes to (1) any damage to or destruction of any telecommunications system on **Railroad's** property; (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its **Contractor**, agents and/or employees, on **Railroad's** property. **UDOT** shall not have or seek recourse against **Railroad** for any claim or cause of action for alleged loss of profits or revenue or loss of service or other consequential damage to a telecommunications company using **Railroad's** property or a customer or user of services of the fiber optic cable on **Railroad's** property. **UDOT's** obligation to indemnify the **Railroad** shall be limited by the liability caps in the Governmental Immunity Act. Nothing in this Agreement shall be construed to waive any provision of the Utah Governmental Immunity Act.

B. As used in this Section, "Railroad" includes other railroad companies using **Railroad's** property at or near the location of the Work Site and their officers, agents and employees; "Loss" includes loss, damage, claims, demands, actions, causes of action, penalties, costs and expenses of whatsoever nature, including court costs and attorneys' fees, which may result from: (i) injury to or death of persons whomsoever (including **Railroad's** officers, agents and employees, **UDOT's** officers, agents and employees, as well as any other

person) and (ii) damage to or loss or destruction of property whatsoever (including UDOT's property, damage to the roadbed, tracks, equipment, or other property of Railroad, or property in its care or custody).

C. As a major inducement and in consideration of the permission herein granted, **UDOT** agrees to indemnify and hold harmless **Railroad** from any Loss which is due to or arises from the Work performed under this Agreement, a breach of the Agreement or the failure to observe the health and safety provisions herein, or any activity or omission arising out of performance or nonperformance of this Agreement by UDOT, its employees or agents; however, that **UDOT** shall not be responsible to indemnify **Railroad** for Loss caused by the negligence of the **Railroad**. UDOT's obligation to indemnify the Railroad shall be limited by the liability caps in the Governmental Immunity Act. The provisions of this paragraph are not intended to create any additional rights to third parties.

19. ASSIGNMENT:

UDOT shall not assign this agreement or any supplement without the prior written consent of the **Railroad**, which approval shall not be unreasonably withheld.

20. SUCCESSOR AND ASSIGNS:

Subject to the preceding section, all the covenants and agreements herein contained shall inure to the benefit of and be binding upon the parties hereto, their successors and assigns.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by the duly authorized officers as of the day and year first above written.

RECOMMENDED FOR APPROVAL:

By 
Chief Railroad Engineer

Date: 2-14-13

APPROVED AS TO FORM:


UDOT Counsel

Date: 2/14/2013

UTAH DEPARTMENT OF TRANSPORTATION

By 
Director

Date: 2-19-13

UDOT COMPTROLLERS OFFICE:


Contract Administrator

Date: 3-6-13

.....

UNION PACIFIC RAILROAD COMPANY

By John J. Hovanec
JOHN J. HOVANEC
AVP ENGINEERING - DESIGN

Date: March 4, 2013

Project No. _____; _____ County
Project Name: _____
UNION PACIFIC RAILROAD COMPANY
Milepost and Subdivision _____
USDOT No. _____
CID No. _____ PIN _____

EXHIBIT A

UNION PACIFIC RAILROAD COMPANY

SUPPLEMENTAL AGREEMENT

Contract to Master Agreement UDOT Finance No. _____

Dated _____

THIS CONTRACT, made and entered into this _____ day of _____, 20_____, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as "**UDOT**" and **UNION PACIFIC RAILROAD COMPANY**, a Registered Corporation in the State of Delaware, hereinafter referred to as the "**Company**",

The parties hereto entered in to a **MASTER AGREEMENT** dated _____, **UDOT** Finance No. _____. All the terms of said **MASTER AGREEMENT** remain in full force and effect unless otherwise specified herein.

NOW THEREFORE, it is agreed by and between the parties hereto as follows:

1. The **Company** will perform the following described work in accordance with the terms and conditions of the **MASTER AGREEMENT**.

USDOT NO. _____, _____ (Location) _____

UPRR Required improvements include:

- _____ (Description of Work) _____
- _____
- _____

2. Prior to proceeding with the work covered herein, the **Company** is required to contact Eric Cheng, Chief Railroad Engineer; Telephone Number 801-965-4284, email echeng@utah.gov, to arrange for daily record keeping.
3. All billings are to be submitted to Chief Railroad Engineer, Utah Department of Transportation, 4501 South 2700 West, Box 143200, Salt Lake City, UT 84114-3200.
4. The estimated cost of the work covered by this **Contract** for crossing USDOT No. _____ is shown in an estimate prepared by the **Company** in the amount of \$ _____, details of which are marked **EXHIBIT A**, attached hereto and thereby made a part hereof.

TOTAL ESTIMATED REIMBURSEMENT TO THE COMPANY IS \$ _____

Project No. _____; _____ County
Project Name: _____
UNION PACIFIC RAILROAD COMPANY
Milepost and Subdivision _____
USDOT No. _____
CID No. _____ PIN _____

Note: The above is an estimate only. Final payment to the **Company** will be based on actual costs incurred as determined upon completion of construction.

5. Upon signature and return of this **Supplemental Agreement** to UDOT, the **Company** is authorized to proceed with the work covered herein.

IN WITNESS HEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

RECOMMENDATION FOR APPROVAL: UTAH DEPARTMENT OF TRANSPORTATION

By: _____
Chief Railroad Engineer
Date: _____

By: _____
Director, Traffic and Safety Division
Date: _____

APPROVED AS TO FORM:

The Utah State Attorney General's Office has previously approved all paragraphs in this Agreement as to form.

UDOT COMPTROLLER'S OFFICE:

By: _____
Contract Administrator
Date: _____

ATTEST:

UNION PACIFIC RAILROAD COMPANY,
A Corporation of the State of Delaware.

By: _____
Title: _____
Date: _____
(IMPRESS SEAL)

By: _____
Title: _____
Date: _____

X3. State Rail Plan Railroad Company Information and Location Maps

2.1.2 Amtrak (National Railroad Passenger Corporation)

Table 2.1 – Amtrak Information

Federal Railroad Administration Abbreviation:	ATK
Surface Transportation Board Classification:	Class 1 Railroad
Category:	Passenger
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	368
Number of Utah Employees:	51 (FY2013)
Total Utah Employee Earnings:	\$4,115,485 (FY2013)
Utah Ridership:	55,283 (FY2013)
Amtrak Purchase of Goods and Services in Utah	\$9,039,874 (FY 2013)
Signal Type:	Centralized Traffic Control (CTC)

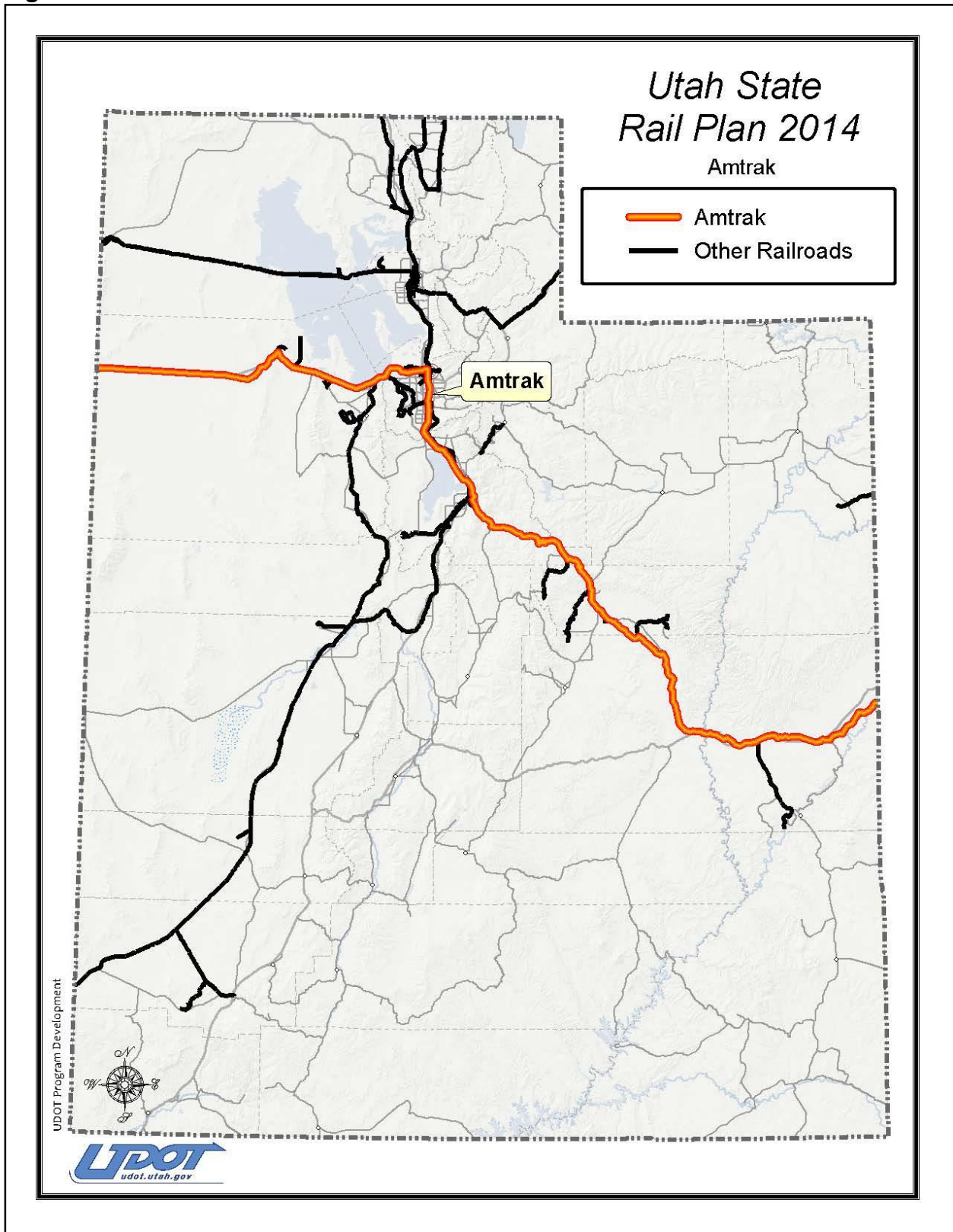
Sources: Federal Railroad Administration, 2013. Amtrak Government Affairs, Fiscal Year 2012.

The National Railroad Passenger Corporation, known as Amtrak, is a quasi-governmental corporation that took over most of America's intercity passenger trains from the private railroad companies on May 1, 1971. Amtrak's formation was the result of the privately-operated passenger trains becoming uneconomical in the face of massive government investment in highways, airports, and other competing modes after World War II. Prior to May 11, 1997, Salt Lake City/Ogden was an important hub for three Amtrak long-distance passenger routes. Today, only Amtrak's Chicago, IL to San Francisco, CA Bay Area *California Zephyr* continues to serve Utah with stops in Green River, Helper, Provo and Salt Lake City.



Photo by Daniel B. Kuhn

Figure 2.3 – Amtrak



2.1.3 BNSF Railway

Table 2.2 – BNSF Railway Information

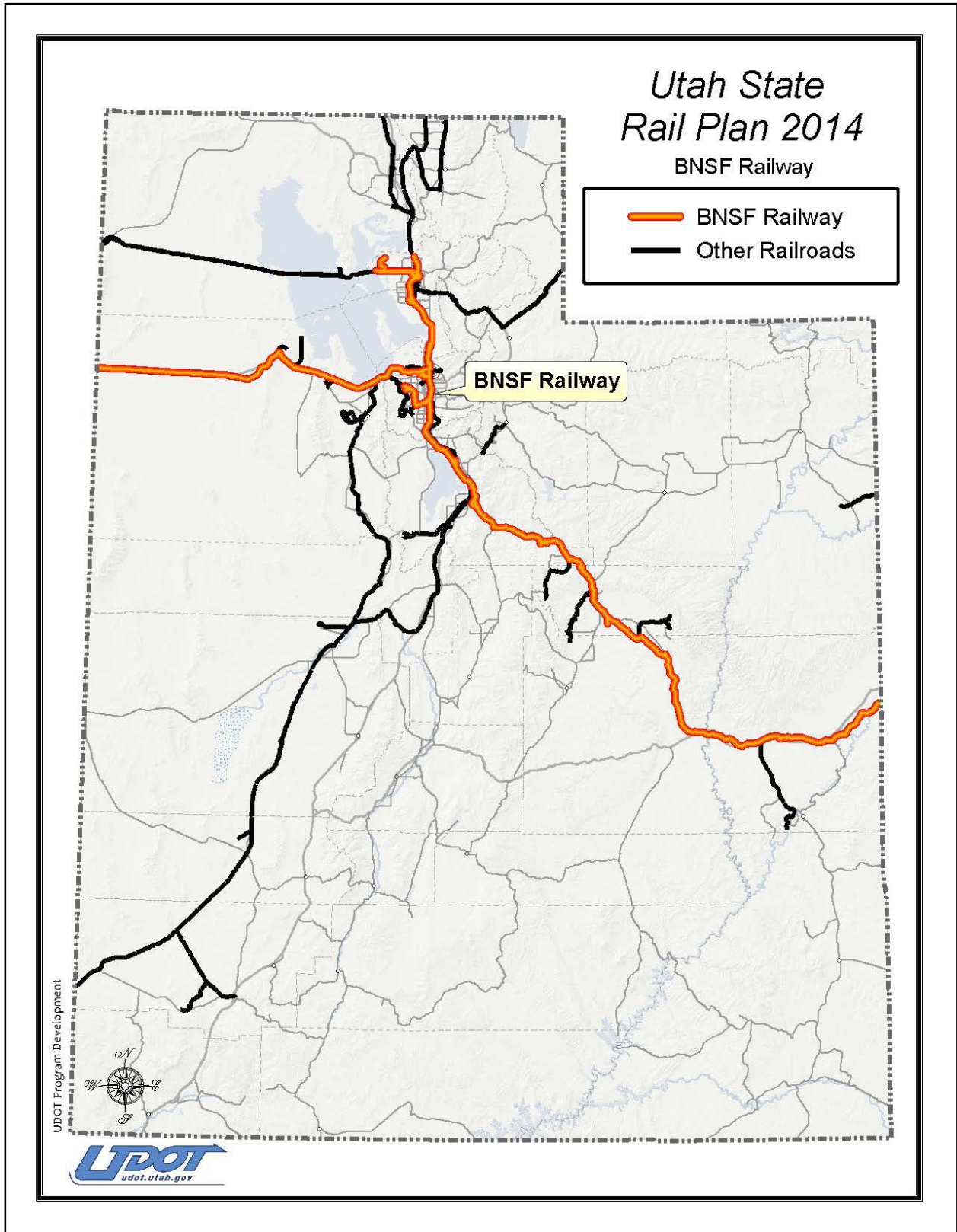
Federal Railroad Administration Abbreviation:	BNSF
Surface Transportation Board Classification:	Class 1 Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	433
Number of Utah Employees:	2
Total Utah Employee Earnings:	Not Available
Taxes Paid to Utah:	Not Available
Signal Type:	See UP Signal Types

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

BNSF Railway, originally known as the Burlington Northern and Santa Fe Railway Company, serves the state of Utah via trackage rights over a route that links Denver, CO with Stockton, CA and throughout the Provo, Salt Lake City and Ogden areas. BNSF's trackage rights over parts of the UP and SP networks were obtained in 1995, when the Surface Transportation Board (STB) granted BNSF the ability to serve customers in Utah via trackage rights in order to maintain freight competition. BNSF, one of America's leading freight railroads, operates in 28 states and two Canadian provinces. In Utah, BNSF currently interchanges with four short line railroads that provide rail served connections to additional customers not located along the former UP and SP lines, connecting over 400 miles of Utah rail lines to BNSF's extensive network.



Figure 2.4 – BNSF Railway



2.1.5 Deseret Power Railway

Table 2.4 – Deseret Power Railway Information

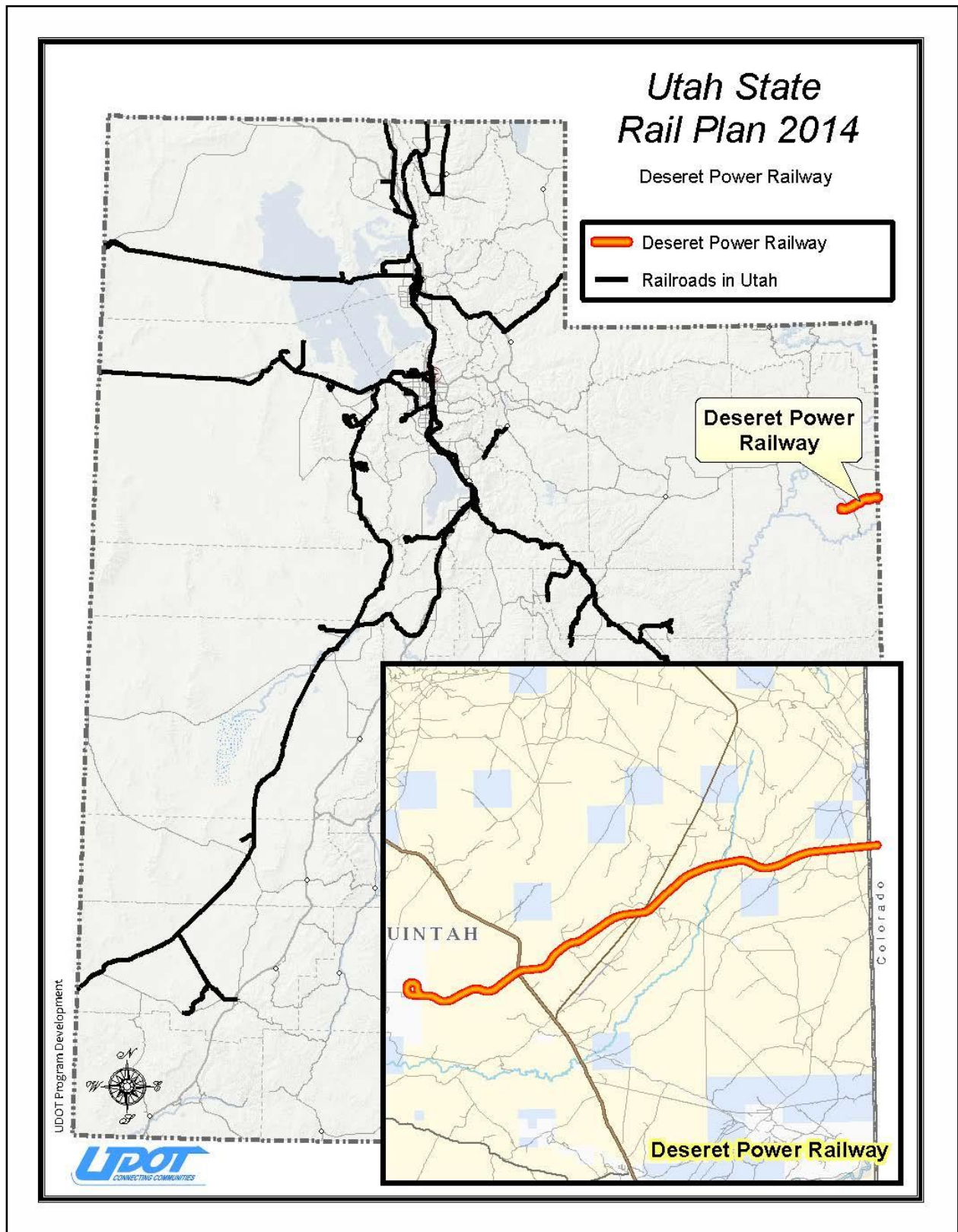
Federal Railroad Administration Abbreviation:	DPRW
Surface Transportation Board Classification:	Class 3 Railroad
Category:	Freight
National Rail System Connection:	No
Number of Rail Miles Operated in Utah:	17
Number of Utah Employees:	2
Total Utah Employee Earnings:	\$120,000
Taxes Paid to Utah:	\$15,400
Signal Type:	None

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Deseret Power Railway (DPRW) is a 33-mile long coal hauling line that is isolated from the rest of Utah's and America's railroad network. Located in northeastern Utah and northwestern Colorado, the DPRW was originally known as the Deseret Western Railway when it commenced operations in 1983. Deseret Power hauls coal from the Deserado Mine northeast of Rangely, CO to the Deseret Electric Power Cooperative steam power plant near Bonanza, UT. Deseret Power Railway is an electric powered operation and all locomotives and rolling stock used on the line had to be trucked in 90 miles from the nearest mainline railroad.



Figure 2.6 – Deseret Power Railway



2.1.6 Heber Valley Railroad

Table 2.5 – Heber Valley Railroad Information

Federal Railroad Administration Abbreviation:	HVRX
Surface Transportation Board Classification:	Class 3 Railroad
Category:	Passenger
National Rail System Connection:	No
Number of Rail Miles Operated in Utah:	16
Number of Utah Employees:	Not Available
Total Utah Employee Earnings:	Not Available
Utah Ridership:	Not Available
Signal Type:	None

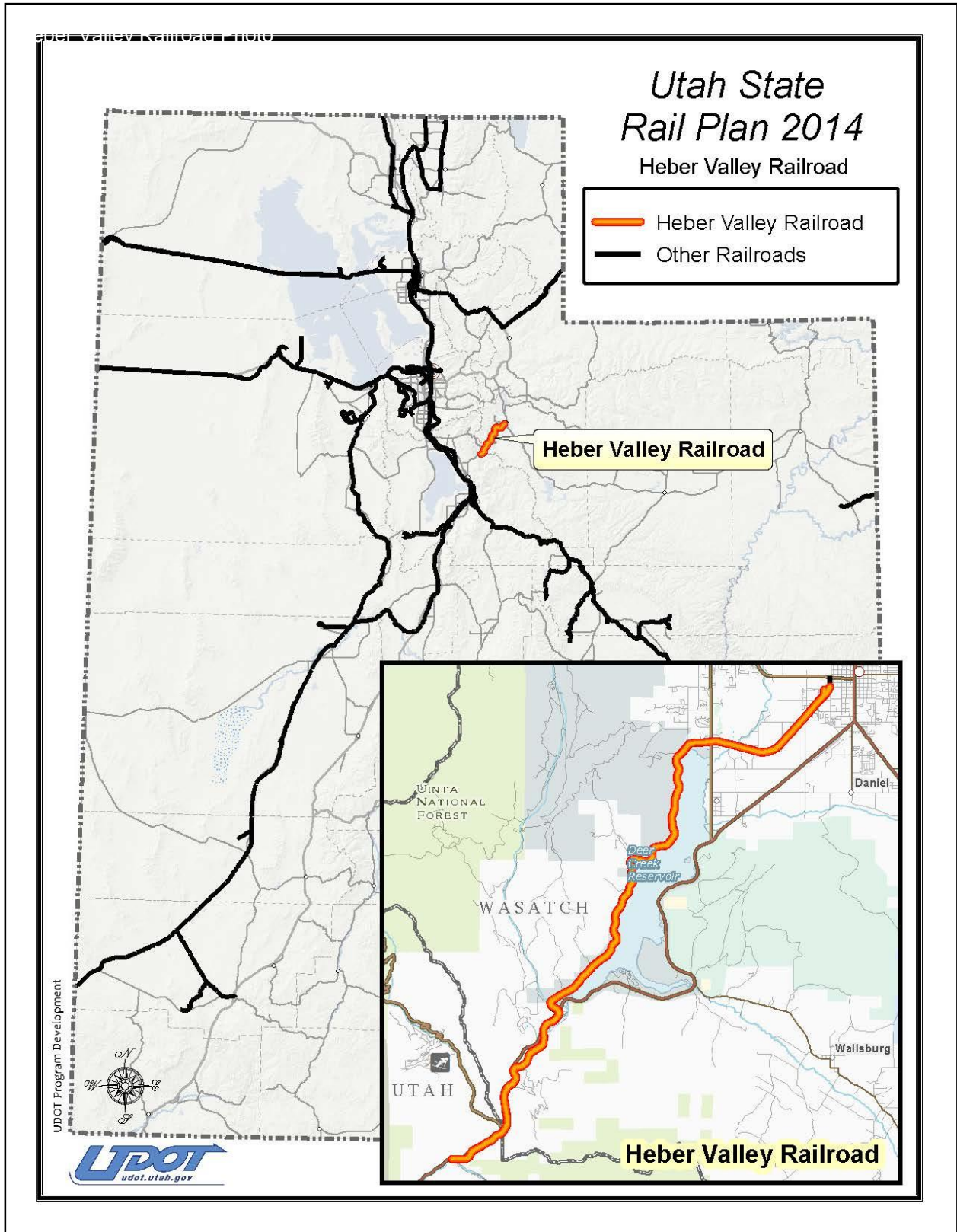
Sources: Federal Railroad Administration, 2013.

The Heber Valley Railroad (HVRX) was originally built in 1899 as a branch of the Denver & Rio Grande Western Railroad, who abandoned the line in 1967. In 1970 the upper end of the line was reopened as the “Heber Creeper” tourist railroad, and was given its present name in the early 1990’s. Operating both steam and diesel-electric locomotives and historic passenger cars, the HVRX played a role in the 2002 Salt Lake Winter Olympics and has appeared in more than 20 motion pictures. HVRX no longer has a connection to the mainline rail network in Utah with equipment having to be trucked-in. The HVRX is 16 miles long and operates from Heber City to Vivian Park in Provo Canyon in the nearby Wasatch Mountains.



Heber Valley Railroad Photo

Figure 2.7 – Heber Valley Railroad



2.1.8 Salt Lake City Southern Railroad

Table 2.7 – Salt Lake City Southern Railroad Information

Federal Railroad Administration Abbreviation:	SL
Surface Transportation Board Classification:	Switching and Terminal Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	24
Number of Utah Employees:	Not Available
Total Utah Employee Earnings:	Not Available
Taxes Paid to Utah:	Not Available
Signal Type:	See UTA Signal Types

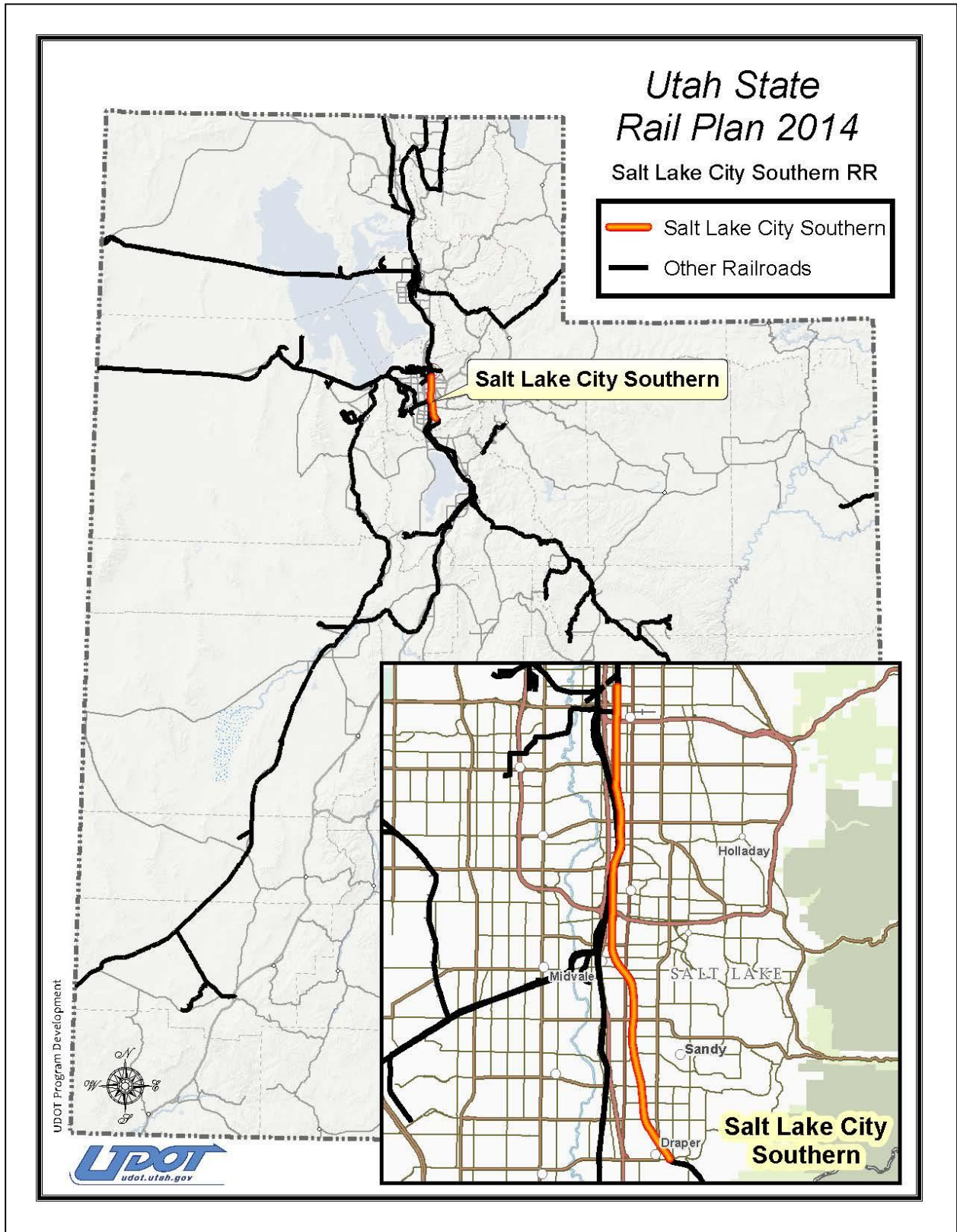
Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Salt Lake City Southern (SL) Railroad began operations in 1993 as a RailTex subsidiary and is today owned and operated by Genesee & Wyoming, Inc. SL operates over most of the 25 miles of former UP Provo Subdivision line that was sold to UTA in 1993. UTA began light rail transit operations over this route in 1999, with freight service restricted to between 12:00 a.m. to 5 a.m. when light rail vehicles are not operating.



Photo by Vern Keeslar

Figure 2.9 – Salt Lake City Southern Railroad



2.1.9 Salt Lake, Garfield and Western Railway

Table 2.8 – Salt Lake, Garfield and Western Railway Information

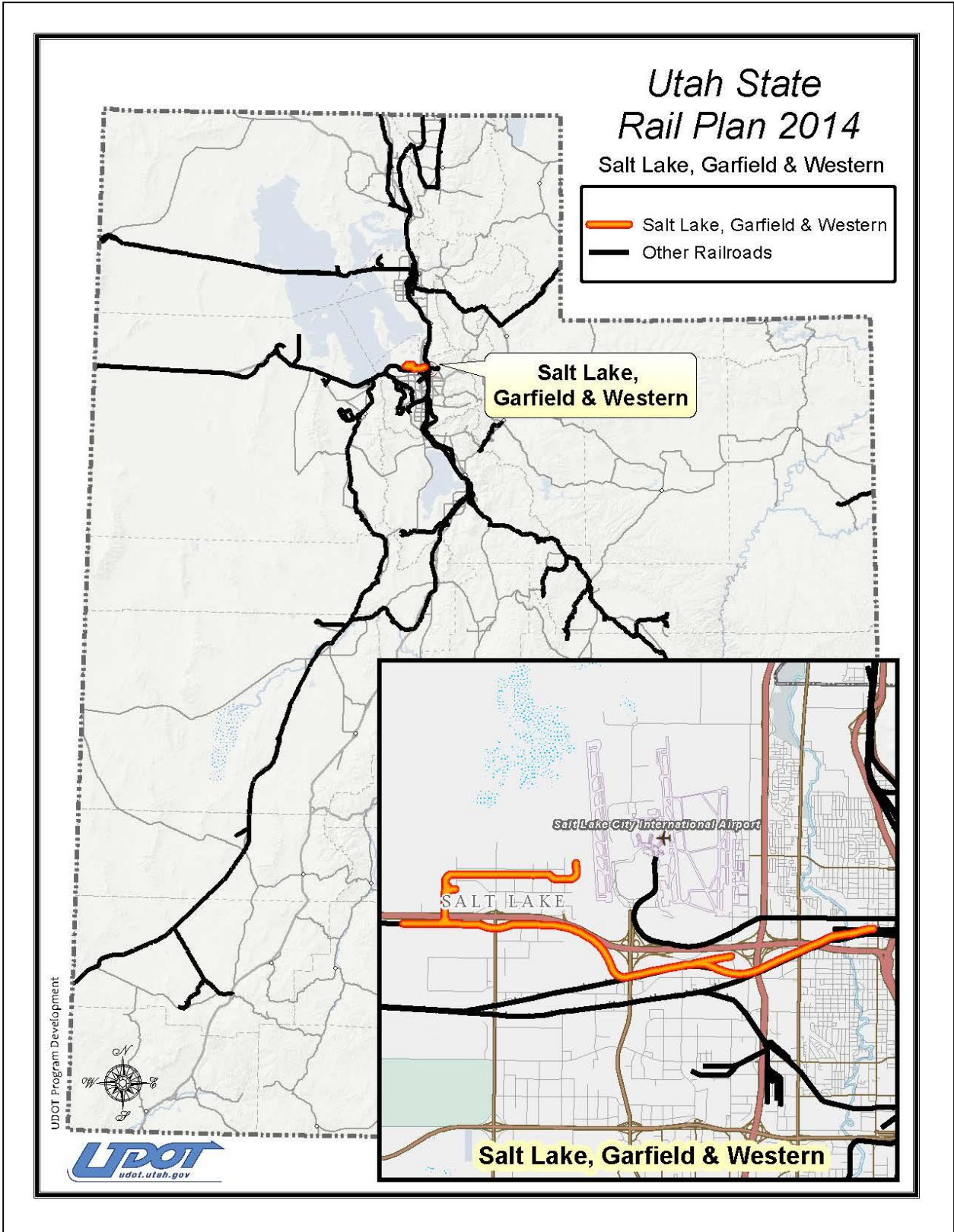
Federal Railroad Administration Abbreviation:	SLGW
Surface Transportation Board Classification:	Class 3 Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	12
Number of Utah Employees:	2
Total Utah Employee Earnings:	\$92,883
Taxes Paid to Utah:	\$45,292
Signal Type:	None

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Salt Lake, Garfield & Western (SLGW) Railway dates back to 1891 when it served resorts at the south end of the Great Salt Lake. Today the SLGW provides freight service to industries and warehouses west of downtown Salt Lake City and at the International Center business and warehouse area near the Salt Lake City International Airport. The SLGW owns its 12-mile line and connects with the UP and BNSF in Salt Lake City.



Figure 2.10 – Salt Lake, Garfield and Western Railway



2.1.10 Savage, Bingham and Garfield Railroad

Table 2.9 – Savage, Bingham and Garfield Railroad Information

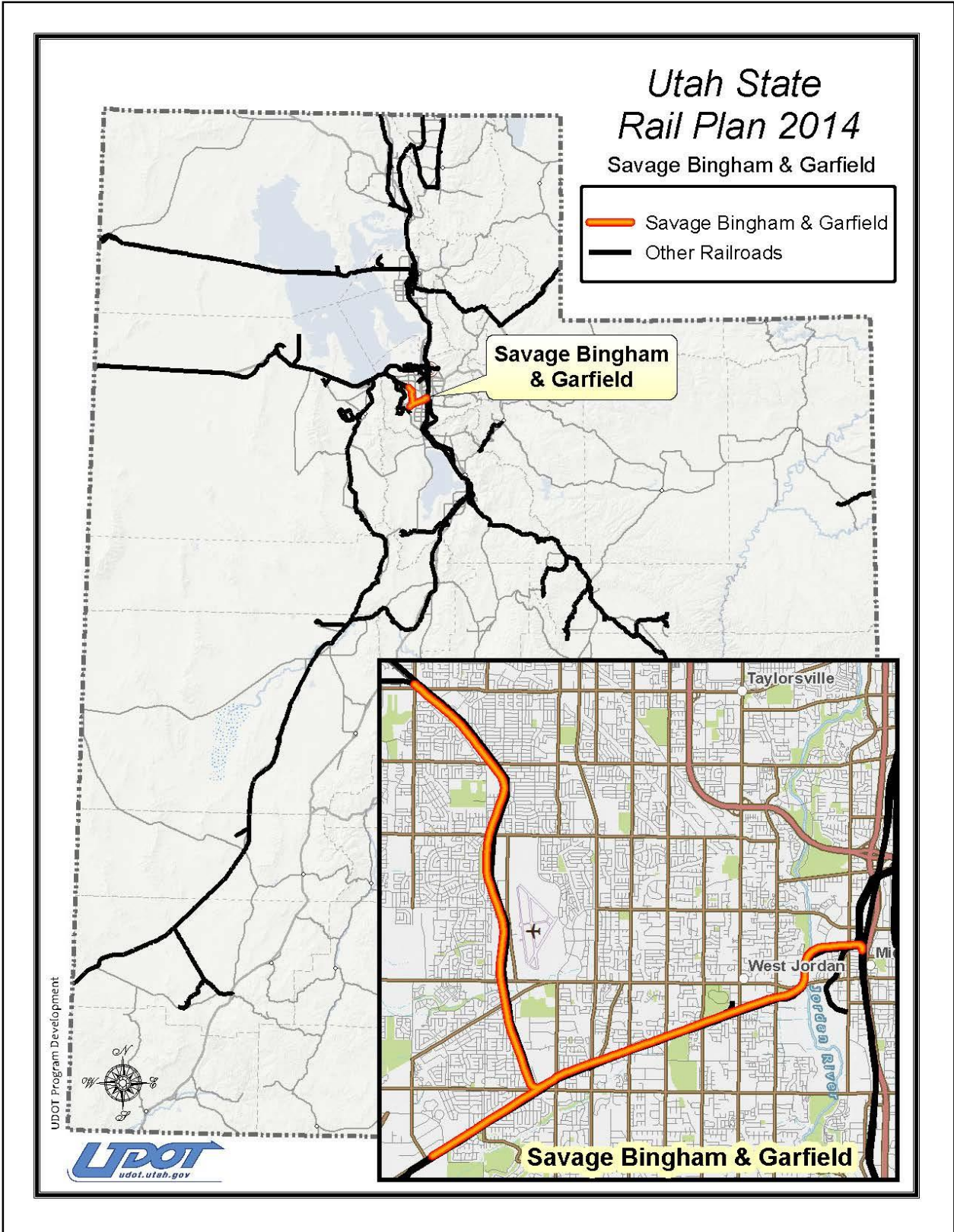
Federal Railroad Administration Abbreviation:	SBG
Surface Transportation Board Classification:	Switching and Terminal Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	21
Number of Utah Employees:	Not Available
Total Utah Employee Earnings:	Not Available
Taxes Paid to Utah:	Not Available
Signal Type:	See UTA Signal Types (None past UTA lines)

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Savage, Bingham & Garfield Railroad (SBG) commenced freight operations in 2007 over portions of the UP's former D&RGW Bingham and Garfield branches on the southwest side of the Salt Lake Valley. Railroad operations are centered at the former D&RGW Midvale Yard, which is today primarily a BNSF/Utah Railway facility. A portion of SBG's operations are limited to between the hours of 12:00 a.m. and 5:00 a.m. due to UTA's light rail operations. Savage Bingham & Garfield handles interstate freight to and from both UP and BNSF Railway.



Figure 2.11 – Savage, Bingham and Garfield Railroad



2.1.11 Union Pacific Railroad

Table 2.10 – Union Pacific Railroad Information

Federal Railroad Administration Abbreviation:	UP
Surface Transportation Board Classification:	Class 1 Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	1,249
Number of Utah Employees:	1,400
Total Utah Employee Earnings:	\$121,800,000
Taxes Paid to Utah:	Not Available
Signal Type:	CTC, ABS, TWC, YL, CTC/ACS, ABS/ACS

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Union Pacific (UP) Railroad is the dominate rail carrier in Utah, owning and operating 1,249 of the 1,343 freight railroad miles in the state. The UP first arrived in Utah while building the eastern segment of America’s first transcontinental railroad, the completion of which was marked by the driving of the famous Golden Spike at Promontory, UT on May 10, 1869. Post-deregulation (1980) mergers allowed UP to take control of all class one rail mileage in Utah by 1996. Today, UP is America’s largest railroad with 31,900 miles of track in 23 states, and Utah serves as a vital crossroads for six UP routes. UP employs nearly 1,400 in Utah, and has made capital investments in the state between 2007 and 2012 of more than \$290 million.

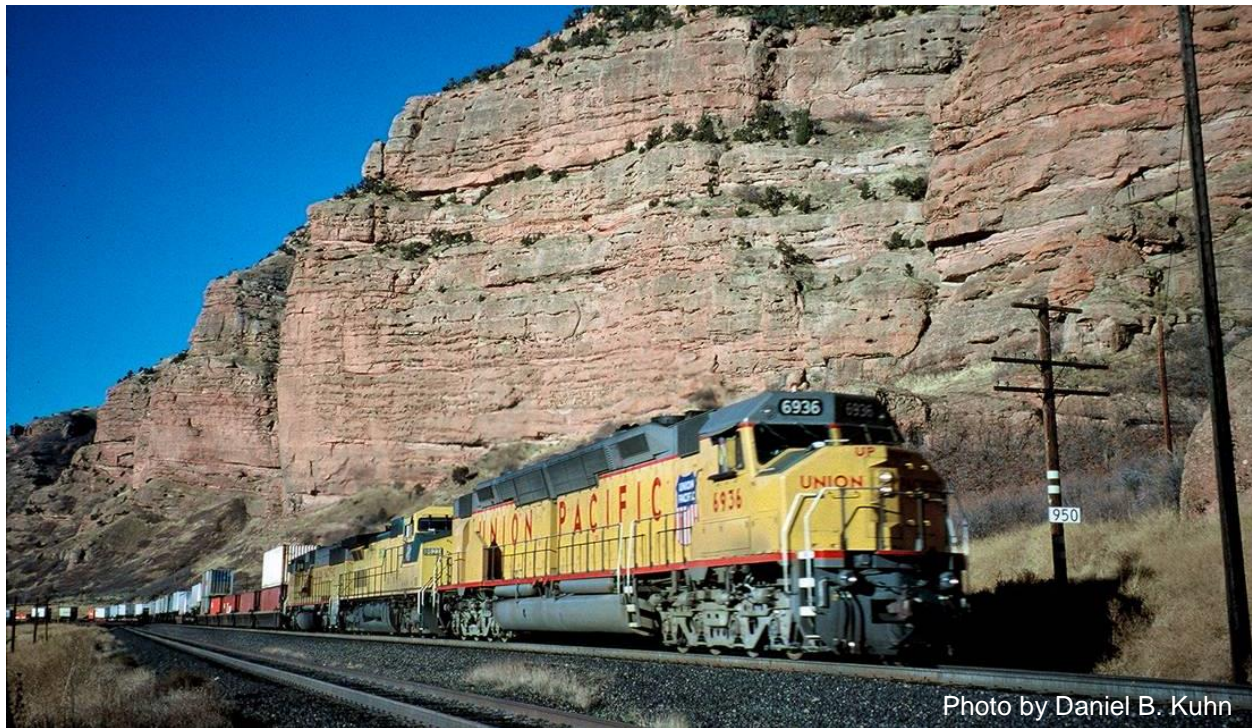
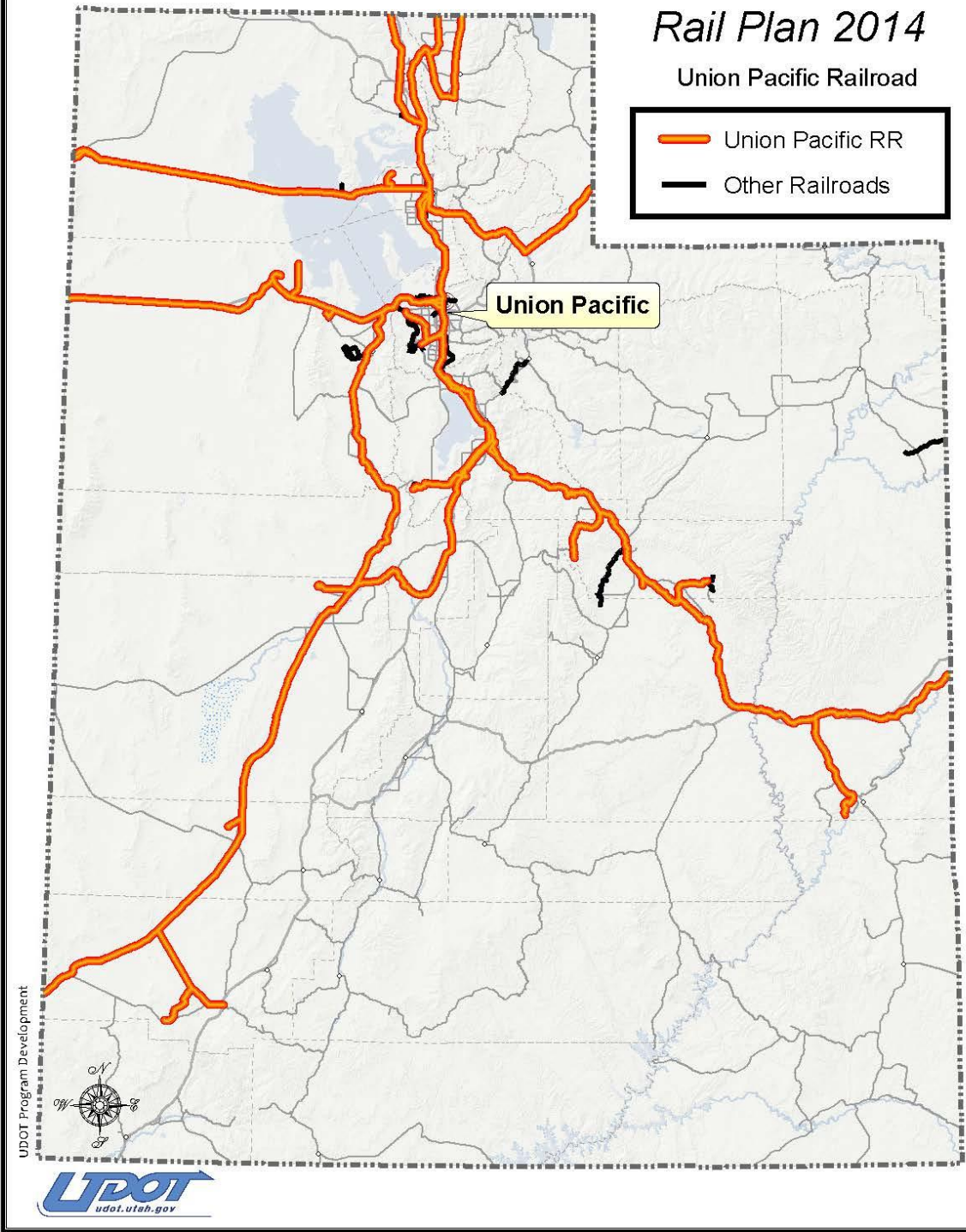
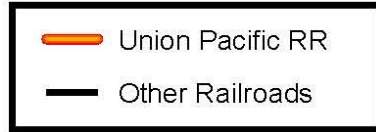


Figure 2.12 – Union Pacific Railroad

Utah State Rail Plan 2014

Union Pacific Railroad



2.1.12 Utah Central Railway

Table 2.11 – Utah Central Railway Information

Federal Railroad Administration Abbreviation:	UCRY
Surface Transportation Board Classification:	Class 3 Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	34
Number of Utah Employees:	Not Available
Total Utah Employee Earnings:	Not Available
Taxes Paid to Utah:	Not Available
Signal Type:	Not Available

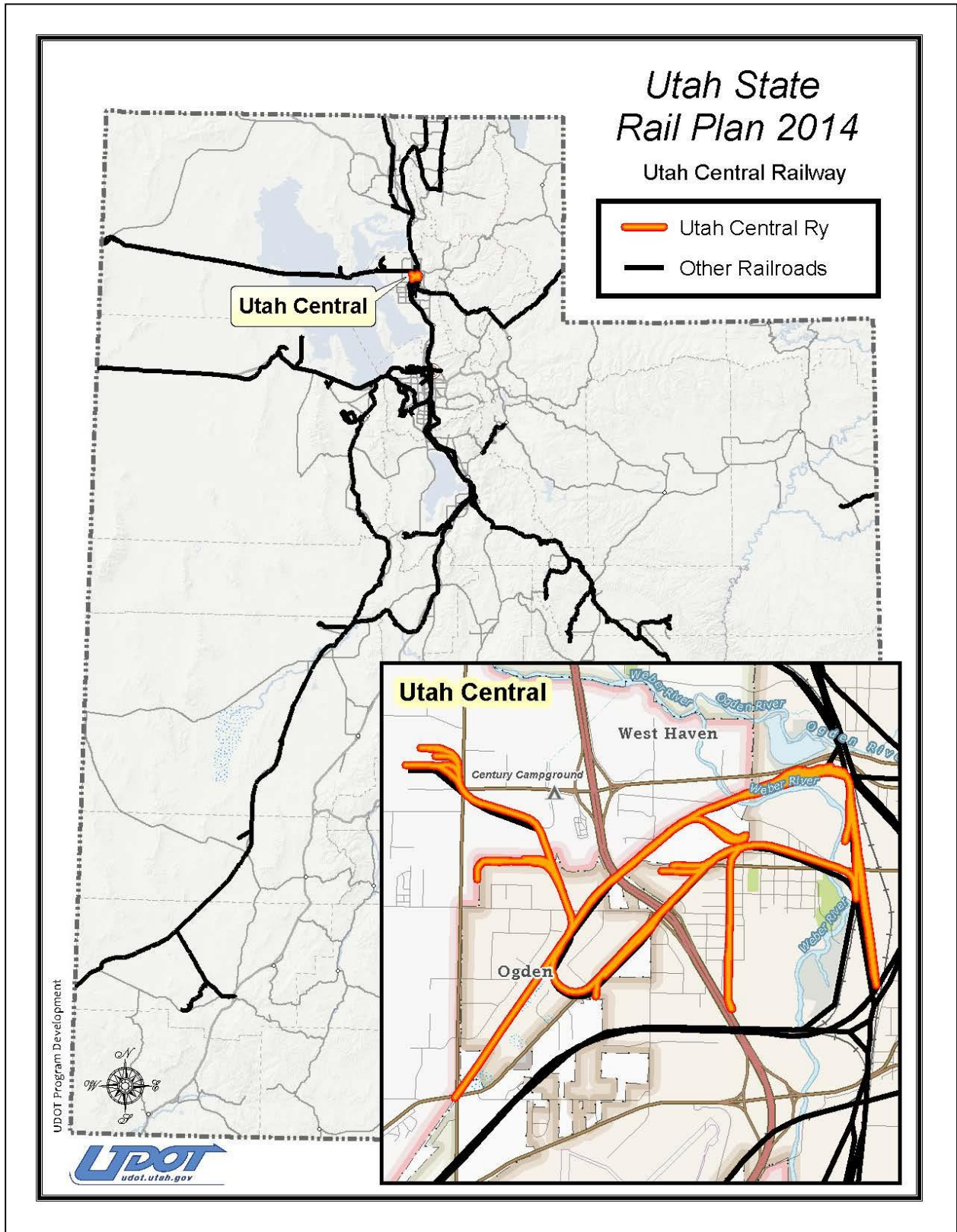
Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

The Utah Central Railway (UCRY) began operations in 1992 as a short line operating over former SP/D&RGW and UP industrial and branch line trackage on the northwest side of Ogden. The Utah Central also handles contract switching operations at Business Depot Ogden which is the former U.S. Army Defense Depot Ogden. Utah Central connects with both UP and BNSF, through its agent Utah Railway, at the former D&RGW Yard in Ogden. In 2008 the Utah Central was sold to short line operator Patriot Rail Corporation of Florida. Today the Utah Central serves 34 miles of track in the growing industrial area in and around Ogden.



Photo by Kent Brown

Figure 2.13 – Utah Central Railway



2.1.13 Utah Railway

Table 2.12 – Utah Railway Information

Federal Railroad Administration Abbreviation:	UTAH
Surface Transportation Board Classification:	Class 3 Railroad
Category:	Freight
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	396
Number of Utah Employees:	69
Total Utah Employee Earnings:	Not Available
Taxes Paid to Utah:	Not Available
Signal Type:	DTC and CTC

Sources: Federal Railroad Administration, 2013. Association of American Railroads, 2012.

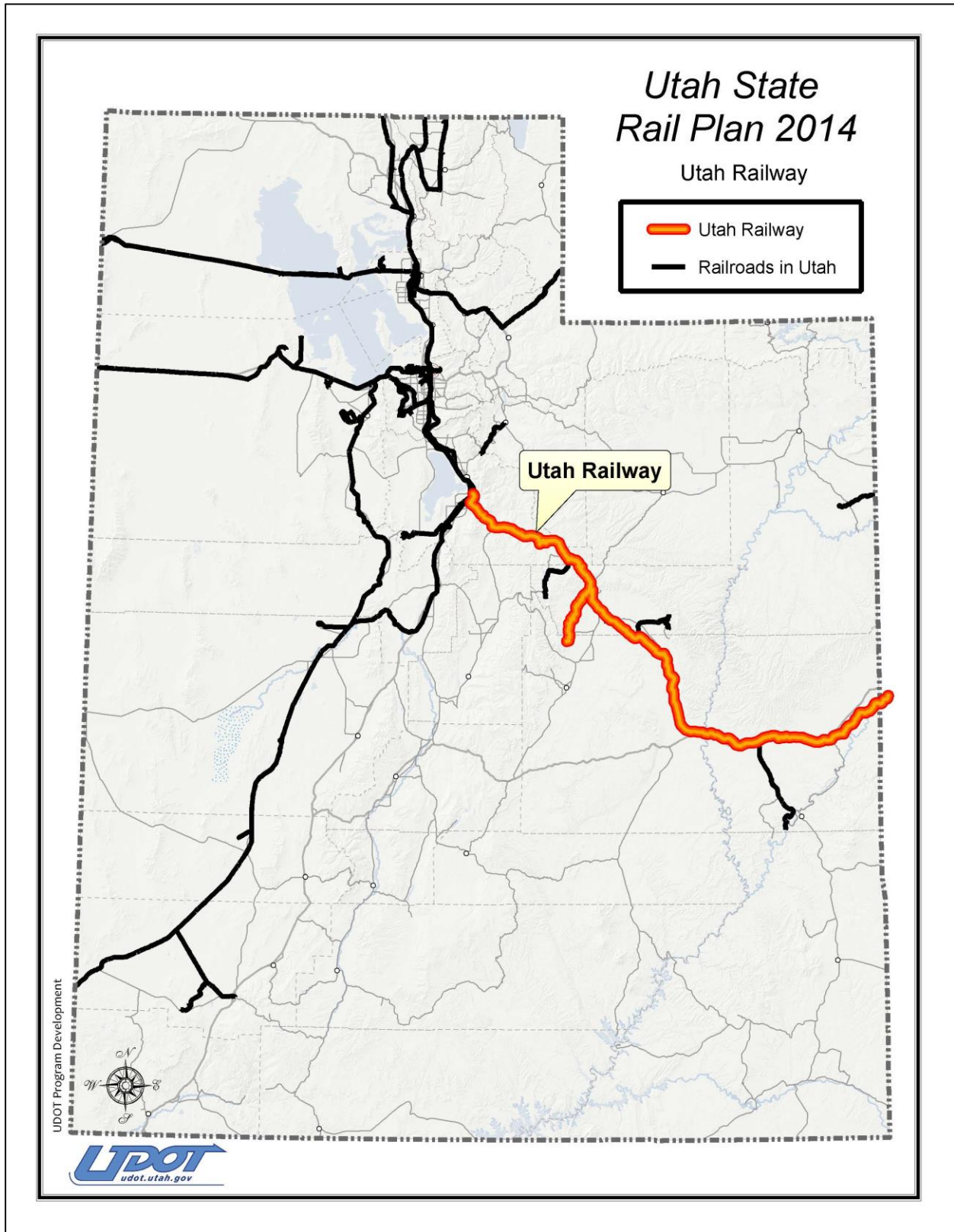
The Utah Railway (Utah) is a Genesee & Wyoming short line railroad that interchanges with BNSF and UP. Originally built in 1912 to access coal mines in Carbon County near Price, UT, the Utah Railway today operates over an extensive network of trackage rights assigned to BNSF Railway that resulted from the UP/SP merger in 1996. As a result of the UP/SP merger, these rights were extended east to Grand Junction, CO, interchange with BNSF Railway and to provide rail freight competition.

Utah Railway serves customers throughout the Provo, Salt Lake City to Ogden Wasatch Front population corridor, including the Little Mountain and Weber areas near Ogden, as an agent of BNSF Railway. The Utah Railway's operations range from local freights serving Wasatch Front oil refineries and other industries to hauling unit trains of coal over the state's highest railroad pass, 7,440 ft. Soldier Summit.



Photo by Vern Keeslar

Figure 2.14 – Utah Railway



2.1.14 Utah Transit Authority *FrontRunner*

Table 2.13 – Utah Transit Authority *FrontRunner* Information

Federal Railroad Administration Abbreviation:	UFRC
Surface Transportation Board Classification:	Local Railroad
Category:	Passenger
National Rail System Connection:	Yes
Number of Rail Miles Operated in Utah:	88
Number of Utah Employees:	523
Total Utah Employee Earnings:	\$35,232,654
Utah Ridership:	3,437,925 (2013)
Signal Type:	ABS, ATC, PTC

Sources: Federal Railroad Administration, 2013.

Utah Transit Authority's *FrontRunner* commuter rail service commenced operations in 2008 over 38 miles of UTA-owned commuter train-exclusive track linking Salt Lake City with Ogden to the north, as well as six miles of track from Ogden further north to Pleasant View that is shared with UP. In 2012 UTA began *FrontRunner* service from Salt Lake City south to Provo over an additional 44 miles of UTA-owned commuter only line. UTA was formed in 1970 as the Wasatch Front population corridor's transit bus provider, expanding into light rail in 1999 and commuter rail in 2008. UTA's service area encompasses more than 1,400 square miles and 75 communities in a six county area that includes 80 percent of Utah's residents.



Photo by Vern Keeslar

Figure 2.15 – Utah Transit Authority *FrontRunner*

