

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

* * * *

IN THE MATTER OF THE APPLICATION)
FOR THE CITY OF THORNTON, COLORADO)
FOR AN ORDER AUTHORIZING THE)
RELOCATION OF RAIL-HIGHWAY)
CROSSING PROTECTION DEVICES ON)
THE RIGHT-OF-WAY OF THE UNION)
PACIFIC RAILROAD COMPANY AND 128TH)
AVENUE NEAR CLAUDE COURT (DOT)
CROSSING NO. 804303G) IN THORNTON,)
COLORADO)

DOCKET NO. 02A-483R

**STIPULATION AND
SETTLEMENT AGREEMENT**

Applicant, the City of Thornton, the Union Pacific Railroad Company, and the Staff of the Public Utilities Commission of the State of Colorado, through their respective counsel, enter into this Stipulation and Settlement Agreement (Stipulation) and agree to all of the terms and conditions set forth herein.

I. INTRODUCTION

A. Background and Procedural History

1. On September 5, 2002 the City of Thornton (City) commenced this matter before the Colorado Public Utilities Commission (Commission) by filing the above-captioned application for authority to relocate rail-highway crossing protection devices on the right-of-way of the Union Pacific Railroad Company (Union Pacific) and 128th Avenue near Claude Court (DOT Crossing No. 804303G) (Crossing) in Thornton, Colorado (Application).

2. On September 11, 2002 the Commission issued its Notice of Application Filed in this Docket.

3. On September 11, 2002 Staff of the Commission (Staff) entered its appearance in this Docket.

4. On October 8, 2002 Union Pacific filed its Entry of Appearance and Notice of Intervention in this Docket.

5. On December 13, 2002 the Commission set this matter for hearing on January 16, 2002.

6. On December 20, 2002 Assistant Attorney General John J. Roberts filed his Entry of Appearance as counsel to Staff in this matter.

7. On January 10, 2003 Staff filed an Unopposed Motion to Vacate Hearing on grounds that the City, Union Pacific, and Staff (collectively, Parties) were involved in settlement negotiations and were in the process of investigating alternative crossing protection device configurations for the Crossing.

8. On January 13, 2003 Administrative Law Judge Ken F. Kirkpatrick granted, by Decision No. R03-0047-I, the Motion to Vacate Hearing and ordered the Parties to file a Joint Status Report on or before May 1, 2003.

9. On May 1, 2003 the Parties filed their Joint Status Report. The Joint Status Report described the Parties' respective positions and detailed four (4) crossing protection device configurations the Parties considered. The Joint Status Report further requested that the Administrative Law Judge set this matter for hearing.

10. On May 9, 2003 (and supplemented on May 21, 2003) the City and Union Pacific jointly filed a Motion for Prehearing Settlement Conference. Staff filed its Response to the Motion for Prehearing Settlement Conference on May 21, 2003. The

Commission granted the Motion for Prehearing Settlement Conference, in Decision No. R03-0576-I, mailed May 27, 2003.

11. On July 16, 2003 Administrative Law Judge Dale E. Isley convened a prehearing settlement conference. The Parties were unable to settle their disputes through the settlement conference and this matter was set for hearing on September 15-16, 2003.

12. Administrative Law Judge Ken F. Kirkpatrick, held the hearing as scheduled.

13. The City and Union Pacific initially proposed a crossing warning system which would utilize a constant warning circuit that would activate the lights, bells and gates when the train would be thirty (30) seconds away from the crossing, regardless of the train's speed. The cost estimate for this proposal was \$185,374, and was marked and submitted as Exhibit 4 at the hearing. A schematic of the proposed system was identified as Exhibit 5.

14. Staff opposed the initial proposal as being unnecessary because of the number of train movements over the crossing and overly costly for a low-speed branch line track.

15. At the close of the hearing, and after additional testimony by Union Pacific's witness Rick Campbell regarding an alternative system that would still give the preemption times desired by the City, the Parties informed Administrative Law Judge Kirkpatrick that they were of the opinion that a workable compromise was possible.

16. Administrative Law Judge Kirkpatrick ordered the Parties to submit, no later than October 6, 2003, either a stipulation settling this matter or a statement that the Parties have not reached a settlement.

II. TERMS AND CONDITIONS

A. Agreement

1. The Parties hereby stipulate and agree that Union Pacific will (a) relocate the existing grade crossing signals to accommodate the proposed road widening, (b) replace the 12-inch flashing light units and the gate-mounted lights with LED flashing lights, (c) add a new AC/DC island circuit at the Crossing, and (d) install a new signal cabin with a pre-emption circuit for the traffic signals at Claude Court, all as described in the Detail of Estimate and Front Sheet (system schematic) attached hereto and marked Exhibit A, which exhibit is intended to replace Hearing Exhibits 4 and 5. These modifications shall be in accordance with the traffic signal phasing design with timing calculations attached hereto and marked Exhibit B. Attached Exhibits A and B are incorporated herein by this reference. The cost of this work is \$110,528.

2. The City agrees to pay the full amount of the cost of the work.

3. The "Public Highway Crossing Agreement" dated June 3, 2003 between the City and Union Pacific (Hearing Exhibit 7) will be amended to reflect the changes set forth in subparagraphs 1 and 2 of this section II.A, above. As so amended, the Public Highway Crossing Agreement is hereby adopted by the Parties as part of this Stipulation, as if fully set forth herein. The City or Union Pacific shall file the amended

Public Highway Crossing Agreement with the Commission as a late-filed exhibit replacing Hearing Exhibit 7.

4. At the hearing on September 15-16, 2003, an agreement for "Improvements to Existing Public Road Grade Crossing" for a new concrete grade crossing surface was offered and admitted into evidence as Hearing Exhibit 8 and an "Estimate of Material and Work Force Account Work" was offered and admitted into evidence as Hearing Exhibit 6. Hearing Exhibits 8 and 6, and the terms and commitments therein, have not changed, and are hereby adopted as part of this Stipulation, as if fully set forth herein.

B. Enforcement, Rights, and Continuing Jurisdiction

1. This Stipulation may be enforced only by the Parties hereto or their successors.

2. The Commission shall retain jurisdiction for the purpose of enabling any of the Parties to this Stipulation to apply to the Commission for such further orders and directions that may be necessary and appropriate for the enforcement of, or compliance with, this Stipulation.

3. The Stipulation constitutes a settlement of disputed and compromised claims and is made for settlement purposes only. All witnesses of the Parties will support all aspects of this Stipulation embodied in this document in any hearing conducted to determine whether the Commission should approve this Stipulation. Each party also agrees that, except as expressly provided in this Stipulation, it will take no action in any administrative or judicial proceeding which would have the effect, directly

or indirectly, of contravening the provisions of this Stipulation. Except as otherwise provided herein, nothing in this Stipulation shall constitute a waiver by any party with respect to any matter not specifically addressed in this Stipulation.

4. This Stipulation shall not become effective until the Commission issues a final order approving the Stipulation, which order does not contain any modification of the terms and conditions of this Stipulation that is unacceptable to any of the Parties to the Stipulation. In the event the Commission modifies this Stipulation in a manner unacceptable to any party hereto, that party may withdraw from the Stipulation and shall so notify the Commission and the other party to the Stipulation in writing within ten (10) days of the date of the final Commission order. In the event a party exercises its right to withdraw from the Stipulation, the Stipulation shall be null and void and of no effect.

5. In the event the Stipulation becomes null and void, or in the event the Commission does not approve this Stipulation, the Stipulation, as well as the negotiations undertaken in conjunction with the Stipulation, shall not be admissible into evidence in any proceeding.

6. The Parties state that they have reached this Stipulation by means of a negotiated process that is in the public interest, and that the results reflected in this Stipulation are just, reasonable, and in the public interest. Approval by the Commission of this Stipulation shall constitute a determination that the Stipulation represents a just, equitable, and reasonable resolution of all issues which were or could have been contested by the Parties with respect to this Docket.

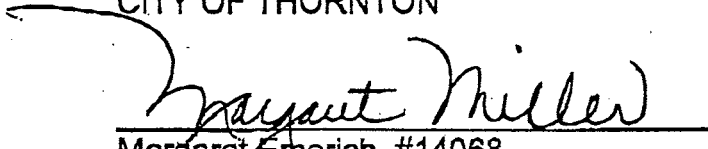
7. This Stipulation is an integrated agreement that may not be altered by the unilateral determination of any party.

8. This Stipulation may be executed in separate counterparts, including facsimile. The counterparts taken together shall constitute the Stipulation. The Parties represent that the signatories to the Stipulation have full authority to bind their respective parties to the terms of the Stipulation.

9. This Stipulation shall be governed by and construed in accordance with the laws of the State of Colorado.

Respectfully submitted this 6th day of October 2003.

CITY OF THORNTON



Margaret Emerich, #14068
Margaret Miller, #17537
9500 Civic Center Drive
Thornton, CO 80229
Attorney for the City of Thornton

UNION PACIFIC RAILROAD COMPANY

James P. Gatlin, #1793
1331 17th St., Suite 406
Denver, CO 80202
Attorney for Union Pacific Railroad Company

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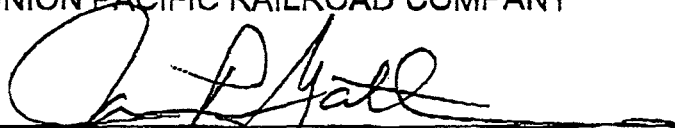
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Respectfully submitted this 6th day of October 2003.

CITY OF THORNTON

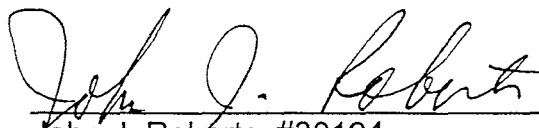
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Thornton, CO 80229
Attorney for the City of Thornton

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James P. Gatlin, #1793
1331 17th St., Suite 406
Denver, CO 80202
Attorney for Union Pacific Railroad Company

STAFF OF THE COLORADO
PUBLIC UTILITIES COMMISSION

A handwritten signature in black ink, appearing to read "John J. Roberts", is written over a horizontal line.

John J. Roberts, #30124

Assistant Attorney General

Business & Licensing Section

1525 Sherman Street, 5th Floor

Denver, Colorado 80203

Telephone: 303-866-5267

Attorney for Staff of the Colorado Public Utilities
Commission

EXHIBIT A

DATE: 2003-09-19

ESTIMATE OF MATERIAL AND FORCE ACCOUNT WORK
BY THE
UNION PACIFIC RAILROAD

DESCRIPTION OF WORK:
 INSTALL LED FL SIGNALS INTO EXISTING GATES, AND ADD AC/DC CIRCUITRY, AND
 CABIN AT 128TH AVE. IN THORNTON, CO. M.P. 9.23 ON THE BOULDER IND. LEAD
 SIGNAL PROJECT MANAGER: PAT OCONNOR 535-4262
 RAILROAD TO PERFORM ALL WORK / COST DISTRIBUTED AS FOLLOWS:
 SIGNAL - CITY OF THORNTON 100% RECOLLECTIBLE

PID: 43452 AWO: 07941 MP, SUBDIV: 9.23, BOULDER
 SERVICE UNIT: 14 CITY: THORNTON STATE: CO

DESCRIPTION	QTY	UNIT	LABOR	MATERIAL	RECOLL	UPRR	TOTAL
ENGINEERING WORK							
ENGINEERING			1452		1452		1452
LABOR ADDITIVE 139%			7877		7877		7877
RECOLL-INSPE			2737		2737		2737
SIG-HWY XNG			1478		1478		1478
TOTAL ENGINEERING			13544		13544		13544
SIGNAL WORK							
BILL PREP			900		900		900
CONTRACT				2266	2266		2266
EARTH FILL/ROCK				1500	1500		1500
FOREIGN LINE FREIGHT				453	453		453
LABOR ADDITIVE 139%			17570		17570		17570
MATL STORE EXPENSE				1133	1133		1133
METER SERVICE				5000	5000		5000
PERSONAL EXPENSES				9750	9750		9750
SIGNAL			12639	22669	35308		35308
TRANSPORTATION CHARGES				3104	3104		3104
USAGE EQUIPMENT				20000	20000		20000
TOTAL SIGNAL			31109	65875	96984		96984
LABOR/MATERIAL EXPENSE							
LABOR/MATERIAL EXPENSE			44653	65875			
RECOLLECTIBLE/UPRR EXPENSE					110528	0	
ESTIMATED PROJECT COST							110528
EXISTING REUSEABLE MATERIAL CREDIT					0		
SALVAGE NONUSEABLE MATERIAL CREDIT					0		

RECOLLECTIBLE LESS CREDITS

THE ABOVE FIGURES ARE ESTIMATES ONLY AND SUBJECT TO FLUCTUATION. IN THE EVENT OF
 AN INCREASE OR DECREASE IN THE COST OR QUANTITY OF MATERIAL OR LABOR REQUIRED,
 UPRR WILL BILL FOR ACTUAL CONSTRUCTION COSTS AT THE CURRENT EFFECTIVE RATE.

Appendix A
Docket No. 02A-483R
Decision No. R03-1155
October 10, 2003
Page 12 of 24

FORM 30-1

PAGE 01 MORE

WORK ORDER AUTHORIZATION-DETAIL OF ESTIMATED EXPENDITURES

EST START: 09-19-03
EST COMP: 12-31-03

PROJ NO: 43452
A.W.O. NO: 07941
W.O. NO:
B.I. NO: 02EN10
STATE: CO
VAL SEC: 0506

RAILROAD: UPRR CO.
LOCATION: THORNTON, CO, 128TH ST., BOULDER IND
DEPARTMENT: ENGINEERING SERVICES

SERVICE UNIT: 14

INSTALL LED FL SIGNALS INTO EXISTING GATES, AND ADD AC/DC CIRCUITRY, AND
CABIN AT 128TH AVE. IN THORNTON, CO. M.P. 9.23 ON THE BOULDER IND. LEAD
SIGNAL PROJECT MANAGER: PAT OCONNOR 535-4262
RAILROAD TO PERFORM ALL WORK / COST DISTRIBUTED AS FOLLOWS:
SIGNAL - CITY OF THORNTON 100% RECOLLECTIBLE

FORM 30-1

PAGE 04 MORE

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 LOCATION: THORNTON, CO, 128TH ST., BOULDER IND
 DEPARTMENT: ENGINEERING SERVICES

----- STOCK MATERIAL PLAN -----

ITEM NUMBER	ITEM DESCRIPTION	UNIT COST	QTY	UM	DIRECT MATL \$
02040420	BATTERY, GNB, 75A9 OR 50A13	172.98	6	EA	1038
02040660	BATTERY, GNB, 75A23 OR 50A27	305.28	7	EA	2137
09011240	CABLE TIE, NYLON 1 1/8" MAX. DIA	0.02	200	EA	4
09011980	CABLE TIE, NYLON 3 1/2" MAX. DIA	0.14	20	EA	3
09014950	CIRCUIT BRKR, 120/240V 20A 2 POLE	14.55	1	EA	15
09015690	CIRCUIT BREAKER, 120/240V 30A AC	5.92	1	EA	6
09054300	RELAY, TAB 869 KRP11DN12V. SW.HTR.	7.41	1	EA	7
09054360	RELAY, GEN. PURPOSE 120V. TAB 856	6.77	1	EA	7
09057650	SOCKET, P-B 27E122 TAB 836A & 856	2.06	2	EA	4
09065700	TAPE, ELECTRICAL PLASTIC	0.53	2	RL	1
09066900	TERMINAL, SPADE, 10-12 WIRE, #8 STUD	0.13	10	EA	1
09137100	TERM. LUG 3/16 CABLE-1/4 POST 2412	0.50	30	EA	15
09215100	33466 TERMINAL, RING TONGUE AMP	0.19	24	EA	5
09260350	TERMINAL, #16-14 #8 SPADE	0.06	35	EA	2
09261420	321524-1 TERMINAL, TEST 16-22 A	1.61	4	EA	6
09261570	321527-1 TERMINAL, TEST	1.52	15	EA	23
09401140	ADAPTER, 4 INCH CARLON PLASTIC	2.09	2	EA	4
09409820	BUSHING, 4" PLASTIC, INSULATING	0.75	2	EA	2
09424920	CONDUIT, 4", PVC, TYPE 40	1.33	80	LF	106
09467930	LOCKNUT, 4 INCH, GALVANIZED	3.61	2	EA	7
09602970	LAMP, HALOGEN, 10V, 25W	3.80	1	EA	4
09844170	GROUND ROD, 5/8 INCH X 8 FEET	4.43	5	EA	22
09846750	GRND. ROD CONN. 4WAY ONESHOT.	4.68	5	EA	23
09908640	WIRE, #6 AWG. 1 COND. COPPER, SOLID	0.11	125	LF	14
09912200	WIRE #6 AWG 2 CND 500' ROLL SHIELD	1.13	500	LF	565
09913200	WIRE, #6, 5 COND 500' ROLL SHIELDED	1.86	250	LF	465
09915610	WIRE #6 AWG 1 COND COPPER, STRAN	0.35	175	LF	61
09930550	WIRE #10 AWG 1 COND COPPER, STRAN	0.14	900	LF	126
09932310	WIRE #10 AWG 1 COND COPPER, TWIST	0.31	170	LF	53
09946100	WIRE #14, 7 CND 500' ROLL SHIELDE	1.01	250	LF	253
09960090	WIRE #16 AWG 1 COND COPPER, STRAN	0.08	500	LF	40
13060230	TOGGLE, SPRING WING 3/8	0.43	3	EA	1
13547870	SHEET METAL SCREW, #10 X 1 INCH	0.50	1	BX	1
13552450	SHEET METAL SCREW, #12 X 3/4"	1.98	2	BX	4
13553150	SHEET METAL SCREW #12 X 1"	2.97	1	BX	3
17061400	PADLOCK, SIGNAL, WITHOUT KEY, AMERIC	12.14	2	EA	24
28033210	CARTON, 39 1/8"L X 23 1/4"W X 17	2.88	1	EA	3
28033230	CARTON, 47 3/8"L X 39 1/2"W X 18"	6.80	1	EA	7
28041880	PALLET, 48 X 40 INCH 2/WAY	7.81	2	EA	16
35040010	PLASTER OF PARIS, DENTAL GRADE	0.86	25	LB	22

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402 596 9722 PAGE.007

FORM 30-1

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STATE: CO

VAL SEC: 0506

RAILROAD: UPRR CO.

LOCATION: THORNTON, CO, 128TH ST., BOULDER IND

DEPARTMENT: ENGINEERING SERVICES

39340220 SIGN, HIGHWAY CROSSING	50.00	2 EA	100
52000450 SURGE PROTECTOR SP18-2A	109.33	2 EA	219
52001370 SURGE PROTECTOR SP20-2A TAB 585	68.11	1 EA	68
52002740 BATTERY CONVRTR 2TC. TAB 613	342.35	1 EA	342
52003630 EXTENSION CORD - 12'	66.85	1 EA	67
52005690 BOND WIRE, 7 STRANDS	0.42	50 LF	21
52016830 WIRE DUCT, 2X3	8.26	15 EA	124
52016940 WIRE DUCT, 3X3	9.63	3 EA	29
52017510 WIRE DUCT COVER 2*X6'	1.81	15 EA	27
52017620 WIRE DUCT COVER 3*X6'	2.69	3 EA	8
52019560 EQUALIZER, H.C. TAB 583	8.98	2 EA	18
52021550 FOUNDATION, 4' STEEL, FOR FLSHR/GAT	196.68	2 EA	393
52025240 HOUSE, 6X6, SIGNAL KING	4258.67	1 EA	4259
52027350 CLIP BOARD - FOR SIGNAL PRINTS	6.42	1 EA	6
52027430 STEP BOX	12.67	1 EA	13
52028420 LIGHTNING ARRESTOR, CLR-COMM TAB 3	6.82	12 EA	82
52029780 LIGHTNING ARR. HD TAB 582 W/O BASE	9.64	2 EA	19
52030010 LIGHTNING ARRESTOR CONN. STRIP	4.05	2 EA	8
52039210 RECTIFIER, 20EC, 12V. TAB 575	282.40	1 EA	282
52039390 RECTIFIER, 40EC, 12V. TAB 577	390.68	1 EA	391
52040400 RESISTOR, ADJ. 0.63 OHM TAB 91	24.15	4 EA	97
52040460 RESISTER, ADJ. 5 OHM, TAB 90	12.75	4 EA	51
52068650 TERMINAL, #6 - 5 WIRE - RING TYPE	0.13	20 EA	3
52070010 TERMINAL, #12-10 WIRE, RING TONGUE	0.08	300 EA	24
52071600 TERMINAL, #20-16 WIRE, RING TONGUE	0.06	150 EA	9
52072280 TERMINAL BLOCK, SIGNAL 2 POST BAK	2.28	32 EA	73
52072510 TERMINAL BLOCK, SIGNAL 3 POST TEST	6.14	3 EA	18
52072740 TERMINAL BLOCK, SIGNAL 12 POST 6	8.92	4 EA	36
52074550 TEST LINK, INSULATED ASSEMBLY TAB	0.66	15 EA	10
52074910 TRACK CIRCUIT, TD4	460.85	1 EA	461
52077400 ZENER DIODE, 1.9 VOLT, 1.3 WATT	0.05	1 EA	0
52079550 WIRE TAG, PLASTIC - WHITE	0.12	100 EA	12
52079560 MARKING PEN (FOR WHITE TAG)	1.95	1 EA	2
52092250 CRTU. W/MICROBURST TRANSCIVER.	1693.94	1 EA	1694
52123700 FLASHING LIGHT UNIT, 12" LED COMP	280.89	8 EA	2247
52171500 RECTIFIER, RING 10, TAB 634 STYLE	41.02	1 EA	41
52203400 DETECTOR, LIGHT OUT, LOD-1	452.64	1 EA	453
52246000 RESISTOR, 47,000 (47K) OHM .5 WATT	0.20	4 EA	1
52263600 SURGE ARRESTOR, METER LOOP.	27.83	1 EA	28
52264040 SURGE PANEL - TAB 618	198.04	1 EA	198
52276050 CROSSING ANALYZER, HCA-1	1650.15	1 EA	1650
52707280 RELAY, B1BN, TK. TAB 882 A62-120	522.75	1 EA	523
52726820 RELAY, FLASHER TAB 887	329.81	1 EA	330
52728800 RELAY, B1LC. TAB 911 A62-310	277.83	1 EA	278
52745830 RELAY, NEUTRAL, B1 TAB 884 & 884A	225.15	2 EA	450
52752390 RELAY, B1SR. 3 SEC. TAB 893	413.50	1 EA	414

FORM 30-1

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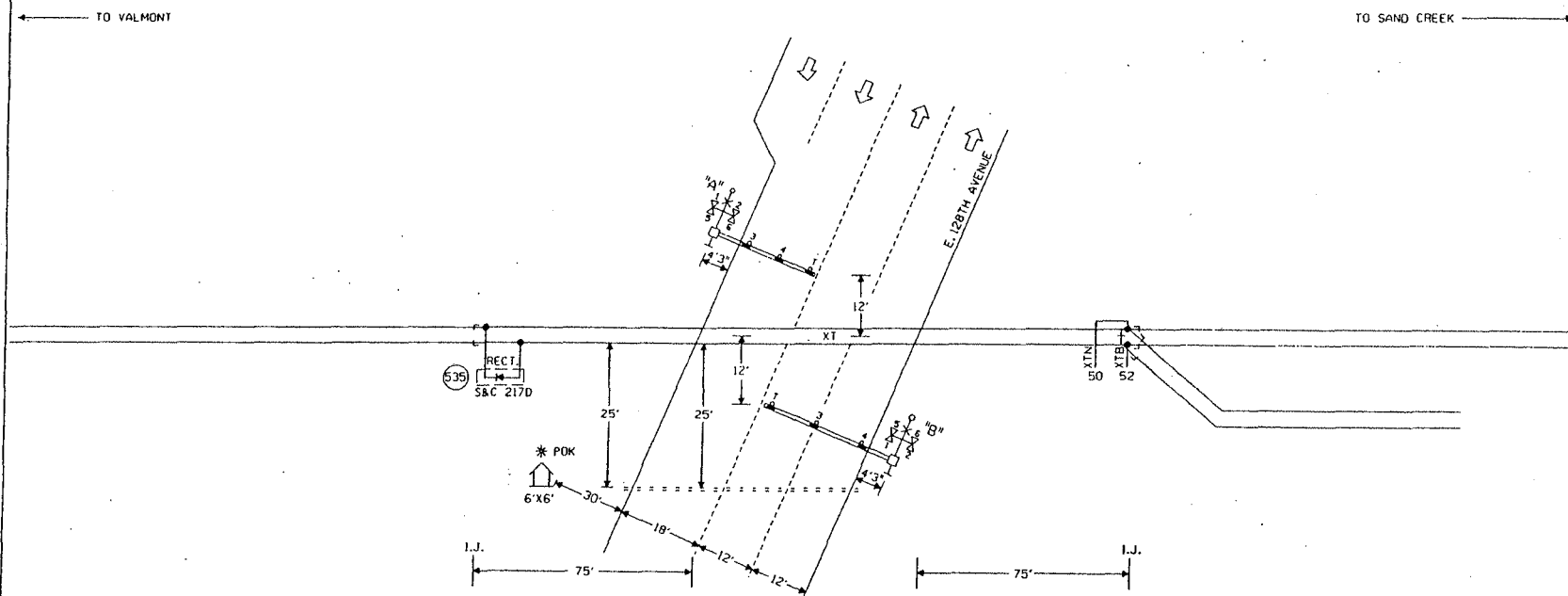
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RAILROAD: UPRR CO.
LOCATION: THORNTON, CO, 128TH ST., BOULDER IND
DEPARTMENT: ENGINEERING SERVICES

52773760 RELAY BRACKET, HOLDS 14 B1 RELAYS	203.99	1 EA	204
52776370 RELAY PLUGBOARD, GRS B1, TAB 900	32.25	6 EA	194
52777970 FLAG TERMINAL, FOR GRS, 14-10	0.88	100 EA	88
52778110 FLAG TERMINAL, FOR GRS, 20-16	1.01	100 EA	101
52779280 RELAY TEST TERM, GRS B1	6.73	6 EA	40
52959000 POWER TAP MATERIAL	1000.00	1 EA	1000
53311490 EXTRACTOR FOR "B" TERMINALS P3-308	9.63	1 EA	10
53311510 TEST NUT WRENCH, GRS #P3-320	33.26	1 EA	33
53648010 INSULATING CAP & SHIELD ASSY.	2.02	10 EA	20
53903460 EPD 120/240TDFL SURGE PROTECTOR	257.75	1 EA	258
53954500 180429-000 BOOTLEG KIT	46.21	1 EA	46

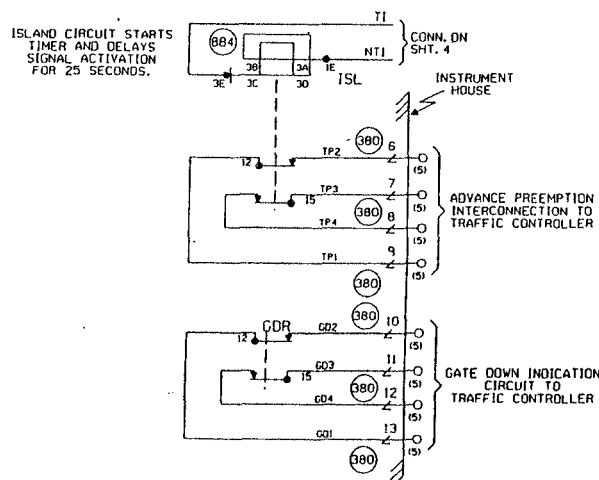
TOTAL

22,673



NOTES:

- ⊗ = TWISTED WIRES
INSULATED 1 TWIST PER FT.
ALL TRACK WIRES 2C. #6
- TRANSMITTER AND RECEIVER LEADS
TO BE SEPARATED BY AT LEAST 12" IN TRENCH.
LENGTHS SHOULD NOT EXCEED MANUFACTURERS
RECOMMENDATION.
- TOP OF FOUNDATION TO BE AT SAME ELEVATION
AS THE SURFACE OF THE TRAVELED WAY & NO
MORE THAN 4" ABOVE THE SURFACE OF THE GROUND.
- ALL BUNGALOW WIRING TO BE #16 AWG FLEX
UNLESS OTHERWISE SPECIFIED EXCEPT ALL GROUND
WIRE TO BE #6 AWG FLEX OR LARGER.
- ALL WIRING IN GATE MECHANISM TO BE #10 AWG FLEX.
- REFER TO UP STANDARD DWG FOR BUNGALOW GROUNDING.
- DO NOT USE 7 CELLS OF B12 BATTERY UNLESS
REQUIRED TO MAINTAIN MINIMUM LAMP VOLTAGE.
- ALL LIGHTS TO BE 12" ROUNDELS.
- ===== 4" X 60" CONDUIT
- LIGHTS: LED LIGHTS
- GATE A: 22'
- GATE B: 28'
- CRU: MICROBURST



- CONSTRUCTION NOTES:**
1. DC ISLAND CIRCUIT AND HOUSE ARE NEW.
 2. GATES AND FLASHERS ARE EXISTING.
 3. INSTALL LED LIGHTS, SIGNAL CABLES.

THORNTON, COLORADO
EAST 128TH AVENUE
M.P. 9.23
BOULDER INDUSTRIAL LEAD
OFF THE CREELEY SUBDIVISION
D.O.T. #804-303C

NEW SHEET


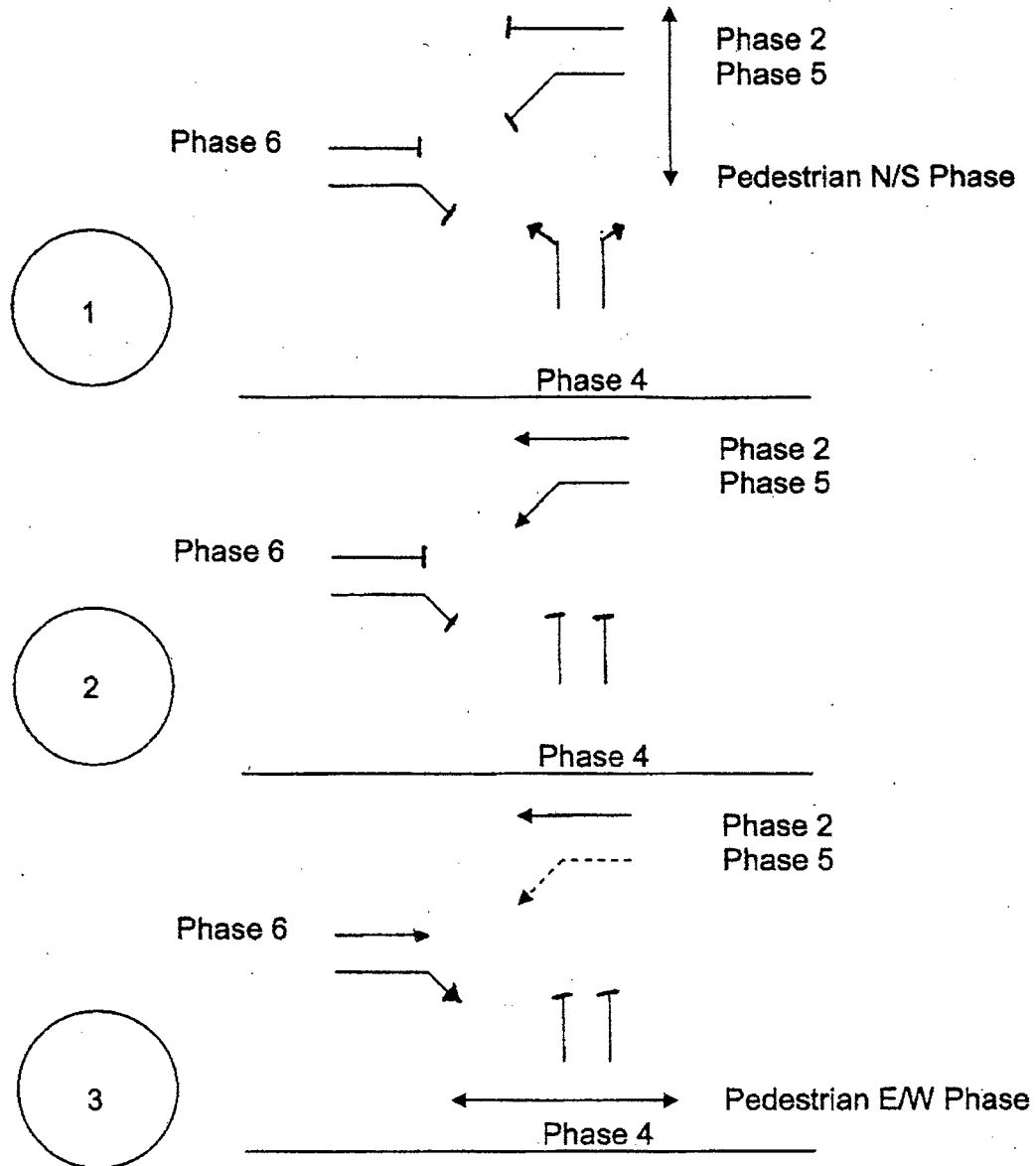
				4-17-83		MODIFICATION LEVEL		UNION PACIFIC		DES: JTB		UNION PACIFIC RAILROAD		DATE 9-17-03	
				INSTALL CWT AT M.P. 9.23		O.A. LAST LEVEL CHG'D.				DGN: JTB		THORNTON, COLORADO		SHEET 1	
						LAST LEVEL MOD. THIS TYP.		SAFETY		CHK: JMM		HIGHWAY CROSSING SIGNALS		DWG 9.23	
						LAST LEVEL BY DESIGNER.		SIGNAL DESIGN		A.F.E. 07941		CONTROL CIRCUITS			
				W.D. 07941 / JMM / JTB		CHANGED FROM TYP. 7 Y/N				ID: 4740923.1X		OFFICE OF CHIEF ENG'R		OMAHA, NEBR. B-4740	

EXHIBIT B

Phasing for 128th Avenue and Claude Court Traffic Signal

Normal cycle length is 100 seconds for the peak rush periods and 90 seconds in the off peak periods.



Railroad Pre-emption Phasing

From Phase 4 and N/S Pedestrian Active

Clearance and Indication Change

FDW	DW	DW
G	Y	R

Then Clear Vehicles from Tracks
Which are Phase 2 and Phase 5
Then go to ALL RED

G	Y	R
---	---	---

←G	←Y
----	----

From Phase 2 and 5 Active

Clear Vehicles from Tracks
Which are Phase 2 and Phase 5
Then go to ALL RED

G	Y	R
---	---	---

←G	←Y
----	----

From Phase 2 and 6 Active

Terminate Phase 6

FDW	DW	DW
G	Y	R

Then Clear Vehicles from Tracks
Which are Phase 2 and Phase 5
Then go to ALL RED

G	Y	R
---	---	---

←G	←Y
----	----

END

Table 5. Traffic Signal - Railroad Preemption Warning Time

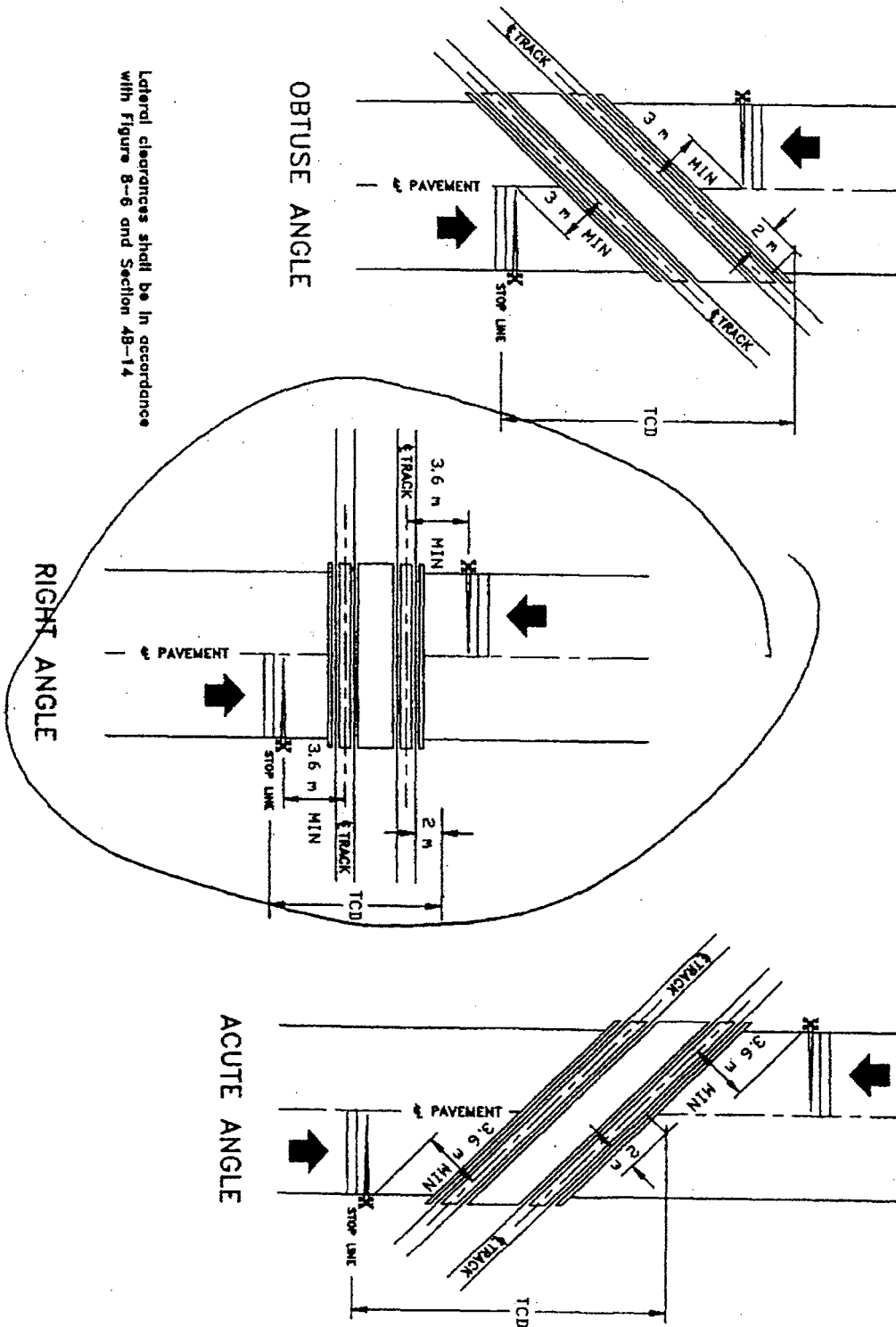
TRAFFIC SIGNAL MAXIMUM PREEMPTION TIME ¹		128TH AVENUE & CLAUDE COURT	
RIGHT of WAY TRANSFER TIME			
Equipment Response ²	<u>1</u> sec.		
Pedestrian Clearance ³	<u>9</u> sec.		
Minimum Green on conflicting phase ⁴	<u>0</u> sec.		
Yellow Change	<u>4</u> sec.		
Red Clearance	<u>1</u> sec.		
Right of Way Transfer Time Subtotal	<u>15</u> SEC.		
CLEAR TRACK INTERVALS		RAILROAD WARNING TIME	
Dissipation of queued vehicles, per lane	<u>11.9</u> sec. (typical) ⁵	(See Appendix B)	
Queue Clearance ⁶	<u>6</u> sec.		
Clear Track Yellow Change	<u>10</u> sec.		
Clear Track Red Clearance	<u>1</u> sec.		
Separation Time	<u>0</u> sec.		
Clear Track Interval Subtotal	<u>29</u> SEC. ⁷	MWT (Minimum Warning Time)	20 sec. (Per MUTCD)
		CT (Clearance Time)	<u>2.5</u> sec.
		AT (Adjustment Time)	<u>1.5</u> sec.
TOTAL MAXIMUM PREEMPTION TIME	<u>44</u> * SEC. ^{8A}	TOTAL RAILROAD WARNING TIME	<u>24</u> SEC. ^{8B}

* This includes minimum 25 second clearance for UPRR.

Notes:

1. If any time element is not used, enter 0 seconds.
2. Up to 1 second - check with manufacturer.
3. If a WALK phase is allowed to continue after preemption is initiated, add this time too.
4. Use if pedestrian clearance is not present or if minimum green is not terminated immediately upon preemption.
5. See the Traffic Engineering Handbook, 1992, pp. 76-77 (how to measure) and p. 120 to include start-up lost time (use 3 sec).
6. Time required for a design vehicle in a standing queue to accelerate from the stop line at the tracks, achieve proper speed and traverse distance CD on Figure D. (See Section II.A.1.a and Section B.1 of this document for discussion and references.)
7. If a second approach needs to be cleared, repeat the same procedure for right of way change, clearance interval for the second approach and add to the time of 8A. The time for the train to travel between crossing 1 and 2 may be subtracted from this total.
8. The Railroad Active Warning/Preemption System should provide a Warning Time that is the LARGER of 8A or 8B.

Figure D. Illustration of Track Clearance Distance



Sources: Figure 8.2 of the Manual on Uniform Traffic Control Devices
Modified to illustrate Track Clearance Distance (TCD)

**Calculation supplement for 128th Avenue and Claude Court Traffic Signal
Railroad Pre-empt Timing**

Queue Clearance

CD = 60 feet

Assume 10 feet per second acceleration

Queue Clearance = $60/10 = 6$ Seconds

Dissipation of Queued Vehicles

Distance, D = 120 feet

Space per vehicle – use 25 feet

Therefore, must dissipate 5 vehicles

Per Webster's Dissipation Rate

1 vehicle @ 3.0 seconds

1 vehicle @ 2.5 seconds

1 vehicle @ 2.3 seconds

1 vehicle @ 2.1 seconds

1 vehicle @ 2.0 seconds

Therefore, Dissipation of Queued Vehicles is 11.9 seconds

Pedestrian Clearance

Width to clear is 36 feet, use 4 feet per second pedestrian speed

Therefore, pedestrian clearance time is 9 seconds

CT Calculation

CT = (60 feet – 35 feet) = 25 and there is 1 second per 10 feet = $25/10 = 2.5$

END

CERTIFICATE OF SERVICE

This is to certify that I have duly served the foregoing STIPULATION AND SETTLEMENT AGREEMENT upon all parties herein by depositing copies of same in the United States mail, postage prepaid (except as noted below), at Denver, Colorado, this 6th day of October 2003, addressed as follows:

Margaret Miller, Esq.
Assistant City Attorney
City of Thornton
9500 Civic Center Drive
Thornton, CO 80229

James P. Gatlin, Esq.
Union Pacific Railroad Company
Law Department
1331 Seventeenth Street, Suite 406
Denver, CO 80202

Matt Condon
Project Manager
City of Thornton
12450 Washington Street
Thornton, CO 80241

Susan Grabler
Manager of Industry and Public Projects
Union Pacific Railroad Company
1400 West 52nd Avenue
Denver, CO 80221

Kent Moorman
City Traffic Engineer
City of Thornton
9500 Civic Center Drive
Thornton, CO 80229

Mike Paras
Superintendent of Transportation
Union Pacific Railroad Company
1400 West 52nd Avenue
Denver, CO 80221

Jack Baier
Public Utilities Commission
1580 Logan Street, OL-2
Denver, CO 80203
BY INTERDEPARTMENTAL MAIL

