Public Utilities
Commission of Ohio

Memo

To: Docketing Division

From: Jill Henry, Rail Specialist, Rail Division

Cc: PUCO Legal Department

Date: 10/29/18

Re: PUCO Case No. 18-1616-RR-FED- In the Matter of a Request for Upgrades to the Active Warning Devices at the Norfolk Southern Railway Crossing, Union Avenue DOT#503-013S, in Stark County, Ohio.

On February 22, 2018, the Ohio Rail Development Commission (ORDC) authorized funding for Norfolk Southern Railway to upgrade the active warning devices at Union Avenue DOT#503-013S, in Stark County, Ohio. The crossing was surveyed, on August 11, 2017, and found to warrant the upgrades. The electric utility provider for this crossing is First Energy Corp.-Ohio Edison.

The project will be paid for with federal funds and is actual cost. The plans and estimates in the amount of $183,949.00 have been approved. Construction may commence at once. **Staff requests a Finding & Order with completion of the project in twelve months.** Staff requests that the following language be incorporated in the Finding & Order:

It is expected that all work necessary for FHWA acceptance of the warning devices will be completed by the in-service due date and that the railroad will be responsible for this work. This work includes, but is not limited to:

- **Any ancillary work to make the warning devices function as designed and visible to the roadway user, and**
- **MUTCD compliance, including minor roadway work if necessary.**

Please serve the following parties of record:

Norfolk Southern Railway Company
Kurt Young
Public Projects Engineer
1200 Peachtree Street NE
Box 123
Atlanta, GA 30309-3597

Norfolk Southern Railway Company
Cayela Wimberly
Director Grade Crossing Safety
1200 Peachtree Street NE
Atlanta, GA 30309-3597

Eastman & Smith LTD.
Mr. Casey Talbott
Attorney for Norfolk Southern
One SeaGate 24th Floor
P.O. Box 10032
Toledo, OH 43699-0032

Ohio Rail Development Commission
Cathy Stout
Safety Manager
1980 West Broad Street
Mail Stop #3140
Columbus, OH 43223

City of Alliance
Curtis Bungard
City Engineer
504 E Main Street
Alliance, OH 44601

First Energy Corp.-Ohio Edison

OHIO RAIL DEVELOPMENT COMMISSION
INTER-OFFICE COMMUNICATION

TO: **Randall Schumacher, Supervisor, Rail Division, PUCO**

FROM: **Cathy Stout, Manager, Safety Section, ORDC**

BY: **James Tucker, Project Manager, ORDC**

SUBJECT: **Stark County, SR 225/Union Ave, Norfolk Southern**
DOT#503013S, PID#106855

DATE: **August 27, 2018**

The Ohio Rail Development Commission (ORDC) established a diagnostic survey at the subject location on August 11, 2017. The Diagnostic Team recommended that the crossing receive LED and equipment upgrades. Copies of the diagnostic review form and the plan and estimate are attached.

PE has already been provided by the railroad. ORDC approves the site plans and estimates as provided. Please issue a construction-only order for the project outlined above for twelve months. This construction authorization is made with the stipulation and understanding that any field work needs prior approval before work begins. This authorization is made with the stipulation and understanding that an approved estimate may contain entries for items or activities that may be cited and found to be ineligible for federal participation during the project audit.

It is expected that all work necessary for FHWA acceptance of the warning devices will be completed by the in-service due date and that the railroad will be responsible for this work. This work includes, but is not limited to:

- Any ancillary work to make warning devices function as designed and visible to the roadway user, and
- MUTCD compliance – including minor roadway work if necessary.

Thank you for your assistance with these matters.

Attachment: Diagnostic Review
Plan & Estimate

c: Jill Henry, PUCO
Susan Arduni, ORDC
ORDC Project Manager (file)

OHIO RAIL DEVELOPMENT COMMISSION

Mail Stop #3140, 1980 West Broad Street, Columbus OH 43223
John R. Kasich, Governor • Mark Policinski, ORDC Chairman

August 27, 2018

Mr. Kurt Young
Public Projects Engineer
1200 Peach Street NE, Box 123
Atlanta, Ga. 30309

RE: Stark County, SR225/Union Ave, DOT #503013S
PID#106855, NS Project 10.3210

Dear Mr. Young:

The plan dated August 1, 2018 and estimate dated August 6, 2018, for the referenced project has been reviewed and is acceptable. **Please note that the railroad must provide ORDC with a plan stamped by a professional engineer licensed in the State of Ohio prior to acceptance and close out of the project.** Norfolk Southern (NS) may proceed with the construction of the proposed LED and equipment upgrades in accordance with the abbreviated plan. This authorization is made with the stipulation and understanding that the approved estimate may contain entries for items or activities that may be cited and found to be ineligible for federal participation during the project audit. Reimbursement of eligible actual cost from ORDC is limited to $183,949.00. Additional costs must be approved in writing by the Ohio Rail Development Commission (ORDC) prior to being incurred. Emergency verbal authorizations by ORDC may be permitted and will be confirmed by ORDC in writing within ten (10) business days of the verbal approval.

This authorization is contingent upon NS accepting the following instructions:

1. NS's project foreman will furnish written notification five (5) working days prior to the date work will start at the project site to James Tucker, ORDC, email james.tucker@dot.ohio.gov and to the Public Utilities Commission of Ohio at jill.henry@puco.ohio.gov NS's project foreman will also notify the same of any stops and re-starts of the work activity and of the date work was completed for the project.

2. NS will arrange for utilities to be located at the project site by the Ohio Utilities Protection Service (OUPS) prior to any construction activities at the site. Utilities that are not participating members of the service must be contacted directly by NS.

3. NS's project foremen will notify James Tucker at 614-398-6897 (telephone) or james.tucker@dot.ohio.gov (email) of any changes in the scope of work, cost overruns, material changes, etc. which are not included in the approved plan and estimate and secure approval of same before the work is performed.

4. Open cut of roadways is not permitted except in unusual circumstances and must be coordinated with the local highway authority and preapproved by ORDC.

5. NS will furnish two (2) copies of each partial bill to ORDC. Please find the enclosed ODOT Purchase Order to reference when billing.

6. NS will furnish two (2) copies of the final all-inclusive bill to ORDC stating the exact dates of starting and completing work, the initial and final dates of construction and location where the accounts may be audited.

7. This installation will include any ancillary work to make the warning devices function as designed and meet MUTCD.

Thank you for your assistance with these matters.

Sincerely,

James Tucker
Project Manager

C: Randall Schumacher, Rail Division Supervisor, PUCO
Jill Henry, Grade Crossing Planner, PUCO
Susan Arduini, ORDC
ORDC (file)

06-Aug-18

Round Figure Estimate for Grade Crossing Warning Devices

City/State: ALLIANCE, OH
Road: UNION AVE
MilePost: RD-67.73
DOT/AAR: 503013S
State Proj. No.: PID 106855
County: STARK
S&E Proj. No.: 10.3210
File Number:
Man Days: 120

Purchases - Others		
Meals and Lodging:	$16,414.27	
Rental of Equipment:	$22,438.25	
(2 Trucks, 1 Backhoe w/ Trailer and 1 Pipe-Pusher for 20 Days)		
Construction Supervision Vehicle:	$3,432.30	
Purchases - Other Total:		$42,284.82
Material And Additives		
Material Cost:	$42,596.00	
Sales and Use Tax:	$3,408.00	
Material Handling Freight:	$4,259.56	
Material Total:		$50,263.56
Labor And Additives		
Labor Cost:	$38,640.00	
(6 man crew at $1,932.00 a day for: 20 days)		
Payroll Tax & Overheads:	$32,944.46	
Preliminary Engineering:	$8,529.73	
Construction Supervision:	$11,286.74	
Labor Total:		$91,400.93
	Project Cost:	$183,949.31
	Scrap / Salvage Credit:	$0.00
	Project Total:	**$183,949.00**

Estimated on: 06-Aug-18
Estimated by: ndney

Estimate valid for 1 year from date of estimate

Norfolk Southern Railway

Highway Crossing Signalization Program - Material List

Do not substitute items without permission from S & E Engineering

City:	ALLIANCE
Road:	UNION AVE
Mile Post:	RD-67.73
Drawing Number:	24120677
State ProjectNumber:	PID 106855
County:	STARK
A A R Number:	503013S
Project Number:	10.3210
File Number:	
New File Number:	CX0156410
WBS:	F-05076
Store Number:	
Supervisor:	UNKNOWN
Tax Code:	

Vendor to supply the following copies after pricing:

1 Set - Material Management with original Invoice
2 Sets - with plans shipped in car with material
1 Set - S&EGen. Supt. Construction w/copy of invoice

Location: ALLIANCE OH S&E Proj. No.: 10.3210 AFE No.: F-05076 Drawing No.: 24120677

Store No.: P.O.Number: Date Required: Date Shipped: Vendor: Interrail Engineering, INC

Qty.	Class-Item-CD	UI	Price per Item	Total Price	Item Description	Quantity Shipped	Quantity Installed Date Quan.	Date Quan.	Date Quan.	Quantity Returned (Credit)	Special Instructions
2	670-503047-4	EA	$183.15	$366.30	BELL, CROSSING ELECTRONIC GENERL SIGNAL, EB-3-360-5 CR 02-044350						
4	670-980689-4	EA	$75.48	$301.92	BRACKET HIGH WIND, (RIGID 3'), WIG- 191036, WALRUS TUSK TYPE						
500	465-939422-4	LF	$2.92	$1,460.00	CABLE, UG 12 CONDUCTOR NO 14 AWG SOLID EACH CONDUCTOR WITH 5/64 IN INSULATION 10 MIL						
800	465-292862-4	LF	$1.49	$1,192.00	CABLE, UG 2-6 TWISTED, S-23 OKONITE 113-12-3933 SOLID TINNED CONDUCTOR						
200	465-277674-4	FT	$3.58	$716.00	CABLE, UG 3CD NUMBER 6 FOR HIGH CURRENT AC POWER OKONITE 206-11-6 243						
500	465-292929-4	LF	$4.12	$2,060.00	CABLE, UG 5 COND. NO. 6 AWG SOLID COPPER CABLE TO MEET NS CORP. SPEC. FOR SIGNAL						
1	670-070249-4	EA	$3,625.00	$3,625.00	CANTILEVER, WT/F ARM 24' W/WALKWAY KIT SAFTRAN #071294-24NS2						
12	670-664917-4	EA	$87.64	$1,051.68	CONNECTOR KIT, WELDED FAR RAIL, CONSISTING OF RUBBER HOSE PROPERLY DRILLED, BONDSTRAND, 1 SPLICING SLEEVE, 1 REDUCING SLEEVE, 3 CLAMPS, 1 TRACK CLIP, 1 WEB WELDED TRACK CONNECTOR, 1 WELD METAL, SAFETRAN 111359-2X						
12	670-632520-4	EA	$79.69	$956.28	CONNECTOR KIT, WELDED NEAR RAIL, CONSISTING OF, RUBBER HOSE PROPERLY DRILLED, BONDSTRAND, SPLICING SLEEVE, 1 REDUCING SLEEVE, 5 CLAMPS, 1 TRACK CLIP, 1 WEB WELDED TRACK CONNECTOR, 1 WELD METAL, SAFETRAN 111359-1X						
2	670-794453-4	EA	$1,253.03	$2,506.06	COUNTERWEIGHT PKAGE, 25-31'GATE S'TAN S- MECH ONLY, STAINLESS TO INCLUDE HUB, SUPPORT ARMS						
2	670-005378-4	EA	$387.95	$775.90	GATE ARM, ALUMINUM, 25-31 FT, ARM ASSEMBLY, INCLUDES GATE GUARD FOR GATE LIGHT CABLE. HIGH INTENSITY VERTICAL STRIPES.						
2	670-092155-4	EA	$160.00	$320.00	LAMP ASSY, LED GATE ARM KIT (INCLUDES 3 LAMPS COMPLETE WITH CABLES AND MTG. HARDWARE) REC #: 9298-1120						
1	670-005054-4	EA	$921.25	$921.25	LAMP ASSY, LED, 12" MAST 1 WAY FRONT LIGHTS (IPN: 042003-L489XNS)						
2	670-005057-4	EA	$952.05	$1,904.10	LAMP ASSY, LED, 4" CANT JURY ARM MAST (FRONT OR BACK) (IPN: 042003-L001534)						

APPROVED BY STATE	APPROVED BY RAILROAD	CAR NUMBER	SEAL NUMBER

Location: ALLIANCE OH S&E Proj. No.: 10.3210 AFE No.: F-05076 Drawing No.: 24120677

Store No.: P.O.Number: Date Required: Date Shipped: Vendor: Interrail Engineering, INC

Qty.	Class-Item-CD	UI	Price per Item	Total Price	Item Description	Quantity Shipped	Quantity Installed Date Quan.	Date Quan.	Date Quan.	Quantity Returned (Credit)	Special Instructions
2	670-005063-4	EA	$952.05	$1,904.10	LAMP ASSY, LED, 4” MAST 1 WAY LIGHTS (IPN: 042003-L484XNS)						
1	670-005066-4	EA	$959.37	$959.37	LAMP ASSY, LED, 5” MAST 1 WAY BACK LIGHTS (IPN: 042003-L001493)						
1	670-005058-4	EA	$1,786.08	$1,786.08	LAMP ASSY, LED, 5” MAST BACK TO BACK LIGHTS (IPN: 042003-L487XNS)						
1	670-201210-4	EA	$5,686.00	$5,686.00	MAST, 12” CANTILEVER, FOR 21’-30’ WT/F ARMS, INCL. LADDER KIT (IPN: 071271-30NS)						
1	670-146525-4	EA	$1,599.00	$1,599.00	MAST, 5" ALUMINUM 22' (0&0) SIDE LIGHT BRACKET HOLE @ 0, W/DBL. JCT. BOX BASE SAFETRAN #070519-X601						
1	670-016194-4	EA	$2,132.88	$2,132.88	MAST, 5" ALUMINUM 22' (0&180) FOR SIDE LIGHT BRACKET HOLE AT 180 W/ DBL JCT BOX BASE (P/N 070519-KIT9)						
2	670-000985-4	EA	$312.09	$624.18	MAST, SIDELIGHT BRACKET F/5"MT. HARMON @225834-XXX, SAFETRAN 041442-26X,						
2	670-521147-4	EA	$3,715.27	$7,430.54	MECHANISM, GATE MODEL S-40, WITH CONTACT HEATER, COMPLETE W/RELAY S'TRAN # 074000-W00090						
2	670-700469-4	EA	$1,185.41	$2,370.82	MODULE, MULTI FREQUENCY ISLAND SAFETRAN #80211 FOR 3000GCP						
4	670-001347-4	EA	$59.67	$238.68	PACKAGE, HARDWARE SIGN 5 IN. MOUNTING, SERRMI A1250-5, HARMON @200965-000, OR						
1	670-514605-4	EA	$11.11	$11.11	PINNACLE, W-C SECT 1-11, 4"& 5" REF K1 110-8 OR SAFETRAN NO. @035045-503X						
2	670-554843-4	EA	$77.05	$154.10	SIGN, 2 TRACK SIGN, HIGH INTENSITY, SAFETRAN #035207-2HX						
2	670-016346-4	EA	$143.23	$286.46	SIGN, X-BUCK, HI-INTENSIVE REFLECTIVE FRT. & BACK FOR ALL STATES, SAFETRAN# 035200-91X						
2	670-393331-4	EA	$37.43	$74.86	SIGN, CROSSING ENS MALFUNCTION ASSEMBLY FOR 4" AND 5" MAST, SAFETRAN #T17215						
20	465-999111-4	LF	$0.38	$7.60	WIRE, NO.10, 1 CONDUCTOR, CASE, FLEXIBLE 37 STRAND, 3/64 IN. INSULATION-ORDER EXT.AMT. NEEDED CR 02-620502						

Total Material: $43,422.27

APPROVED BY STATE	APPROVED BY RAILROAD	CAR NUMBER	SEAL NUMBER

INDEX

SH. NO.	CONTENTS	REVISION NO. 1	2	3	4	5	6	7
1	TITLE, NOTES, INDEX AND REVISIONS	✓	✓	✓	✓	✓		
2	LOCATION PLAN	✓	✓	✓		✓		
3	POWER DISTRIBUTION CIRCUITS	✓	✓	✓	✓			
4	POWER DISTRIBUTION AND CABLE CIRCUITS	✓	✓	✓	✓			
5	3000D2 SAFETRAN GRADE CROSSING PREDICTOR CIRCUITS - UNIT 1	✓	✓	✓	✓	✓		
6	3000D2 GCP SET-UP							
6 7	3000D2 SAFETRAN GRADE CROSSING PREDICTOR CIRCUITS - UNIT 2	✓	✓	✓	✓			
8	3000D2 GCP SET-UP							
7 9	ELECTRO CODE 4 CIRCUITS TRACK 1	✓	✓	✓				
8 10	ELECTRO CODE 4 CIRCUITS TRACK 2	✓	✓	✓				
9 11	LIGHTING CIRCUITS	✓	✓	✓	✓	✓		
10 12	SIGNAL "A" S40 GATE & FLASHER CIRCUITS **GATE CONTROL AND LIGHTING**	✓	✓	✓	✓	✓		
13	SIGNAL "B" S40 GATE & FLASHER CIRCUITS					✓		
11 14	HOUSE AND RACK LAYOUT	✓	✓	✓	✓	✓		
12 15	WALL LAYOUT		✓	✓	✓	✓		
13 16	TERMINAL BOARD ARRANGEMENT		✓	✓	✓	✓		

RED AND YELLOW CHANGES ARE PER EXISTING PLANS IN THE FIELD AND ARE DRAFTING CHANGES ONLY

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

INTERRAIL ENGINEERING 18048 INCORPORATED

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

REVISIONS

1	04-03-98		SWS	SWS
	NEW PLAN DRAWN ACCOUNT INSTALL TCS ON THE CLEVELAND LINE.			
	WO/AFE NO: GG917 PFC NO. 3			
	IN SERVICE: 05-14-01			
	PER: J.J.BENTZ			
2	09-11-00	SWS	SWS	SWS
	REPEATER 67.7 ADDED AT UNION AVENUE ACCOUNT POOR BALLAST CONDITIONS. PLAN CHANGED TO REFLECT INSTALLATION OF 8' X 8' HOUSE.			
	WO/AFE NO: 998091			
	IN SERVICE: 05-14-01			
	PER: J.J.BENTZ			
3	09-04-13	DAM	XRL	PEH
	PLAN REVISED ACCOUNT NEW GCP 4000 INSTALLED AT PARK AVE.			
	PROJECT NO: 10.2059			
	IN SERVICE: 09-05-14			
	PER: RMM			
4	10-20-15	WDM	NS	
	PLAN REVISED ACCOUNT OF INSTALLTION OF S-40 GATE MECHS AND POK CIRCUITS			
	PROJ. NO: **.****			
	IN SERVICE: 10-20-15			
	PER: WDMC		IRE	JWB
5	05-22-18	JWB	IRE	DBS
	PLAN REVISED ACCOUNT OF INSTALLTION OF NEW WARNING DEVICES AT UNION AVE.			
	PROJ. NO:			
	IN SERVICE:			
	PER:			

AAR/DOT #503013S

NORFOLK SOUTHERN

PITTSBURGH DIVISION — CLEVELAND LINE

ALLIANCE, OHIO

UNION AVENUE / REPEATER 67.7

TITLE, NOTES, INDEX AND REVISIONS

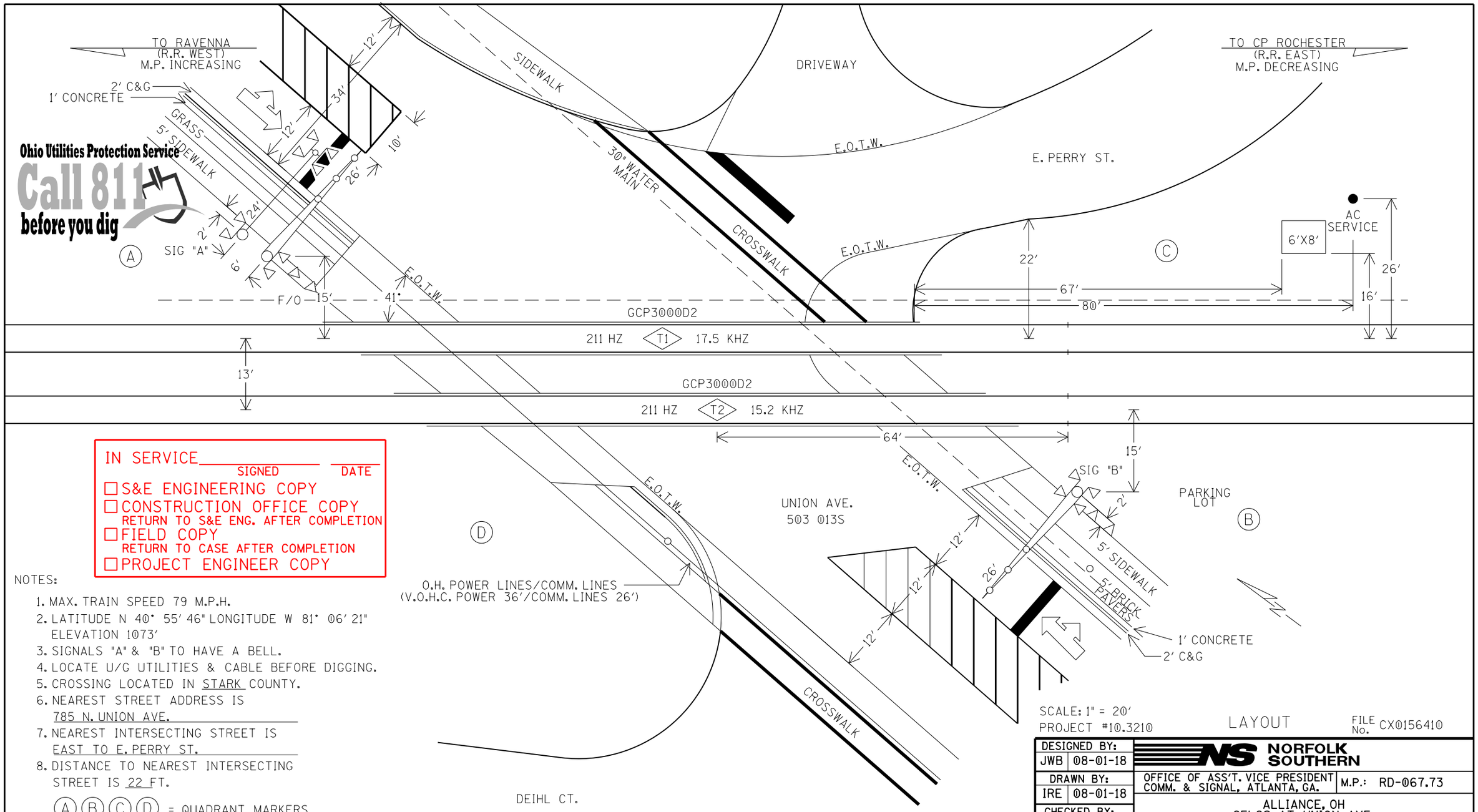
PHILADELPHIA, PA.

APPROVED: _____, PE CAD
CHIEF ENGINEER - C&S

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM	REV. 543 09-04-13	SHEET 1

C&S CAD

24120677.01



Ohio Utilities Protection Service
Call 811
before you dig

IN SERVICE _____ _____
SIGNED DATE

- ☐ S&E ENGINEERING COPY
- ☐ CONSTRUCTION OFFICE COPY
  RETURN TO S&E ENG. AFTER COMPLETION
- ☐ FIELD COPY
  RETURN TO CASE AFTER COMPLETION
- ☐ PROJECT ENGINEER COPY

NOTES:

1. MAX. TRAIN SPEED 79 M.P.H.
2. LATITUDE N 40° 55' 46" LONGITUDE W 81° 06' 21"
   ELEVATION 1073'
3. SIGNALS "A" & "B" TO HAVE A BELL.
4. LOCATE U/G UTILITIES & CABLE BEFORE DIGGING.
5. CROSSING LOCATED IN STARK COUNTY.
6. NEAREST STREET ADDRESS IS
   785 N. UNION AVE.
7. NEAREST INTERSECTING STREET IS
   EAST TO E. PERRY ST.
8. DISTANCE TO NEAREST INTERSECTING
   STREET IS 22 FT.

(A) (B) (C) (D) = QUADRANT MARKERS

SCALE: 1" = 20'
PROJECT #10.3210

LAYOUT

FILE No. CX0156410

DESIGNED BY:	
JWB	08-01-18
DRAWN BY:	
IRE	08-01-18
CHECKED BY:	
DBS	08-01-18
IN SERVICE:	
	- -

NORFOLK SOUTHERN

OFFICE OF ASS'T. VICE PRESIDENT COMM. & SIGNAL, ATLANTA, GA. M.P.: RD-067.73

ALLIANCE, OH
CFLGS AT UNION AVE.

CLEVELAND LINE

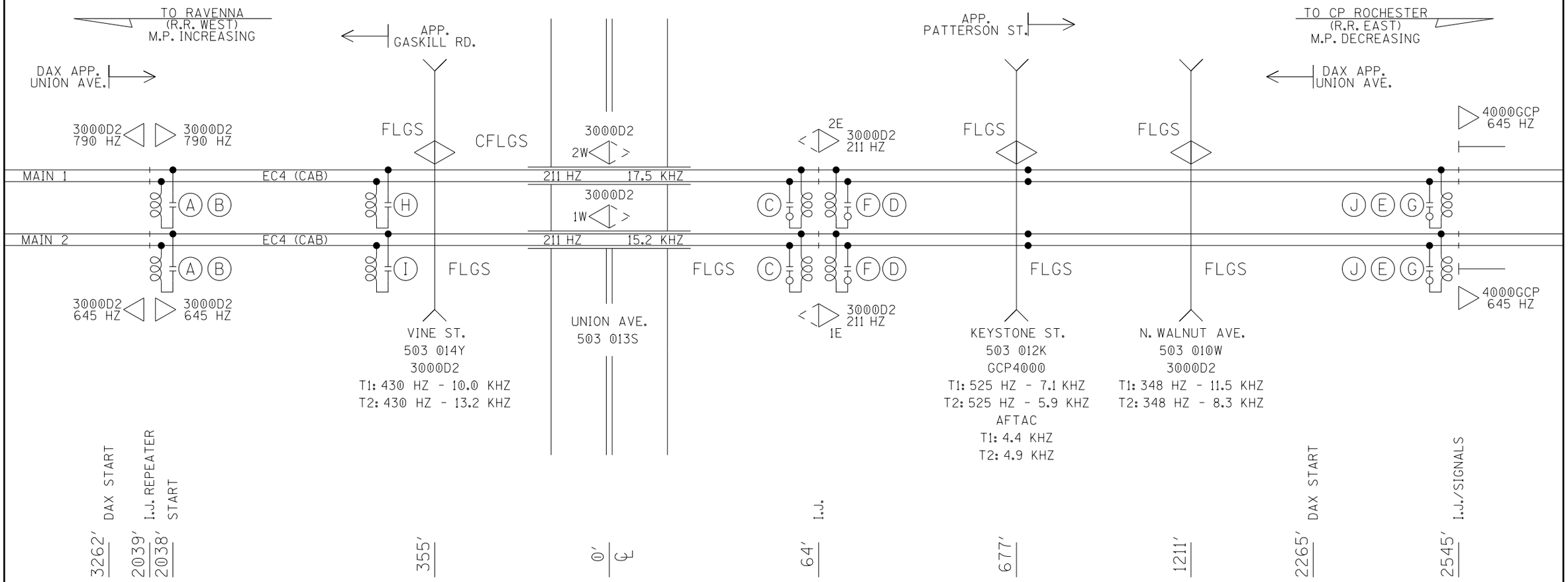
FILE No. R-

CADD or DWG. No. 24120677.01

SHEET No. 1 of 3

REVISION INITIALS												

PROPERTY
PENNSYLVANIA R.R.



Ⓐ- MF-NBS 62775-8621 (211HZ)

Ⓑ- MF-NBS 62775-8621 (430HZ)

Ⓒ- MF-NBS 62775-8621 (430HZ) W/INDUCTOR 8V617-1200

Ⓓ- MF-NBS 62775-5297 (525HZ) W/INDUCTOR 8V617-1400

Ⓔ- MF-NBS 62775-5297 (525HZ) W/INDUCTOR 8V617-200

Ⓕ- MF-NBS 62775-1543 (348HZ) W/INDUCTOR 8V617-200

Ⓖ- MF-NBS 62775-1543 (348HZ) W/INDUCTOR 8V617-1000

Ⓗ- MF-NBS 62775-3497 (790HZ)

Ⓘ- MF-NBS 62775-3497 (645HZ)

Ⓙ- MF-NBS 62775-8621 (211HZ) W/INDUCTOR 8V617-#### ★

★ = FIELD VERIFY D.T.L. AND MARK FOR A.I.S.

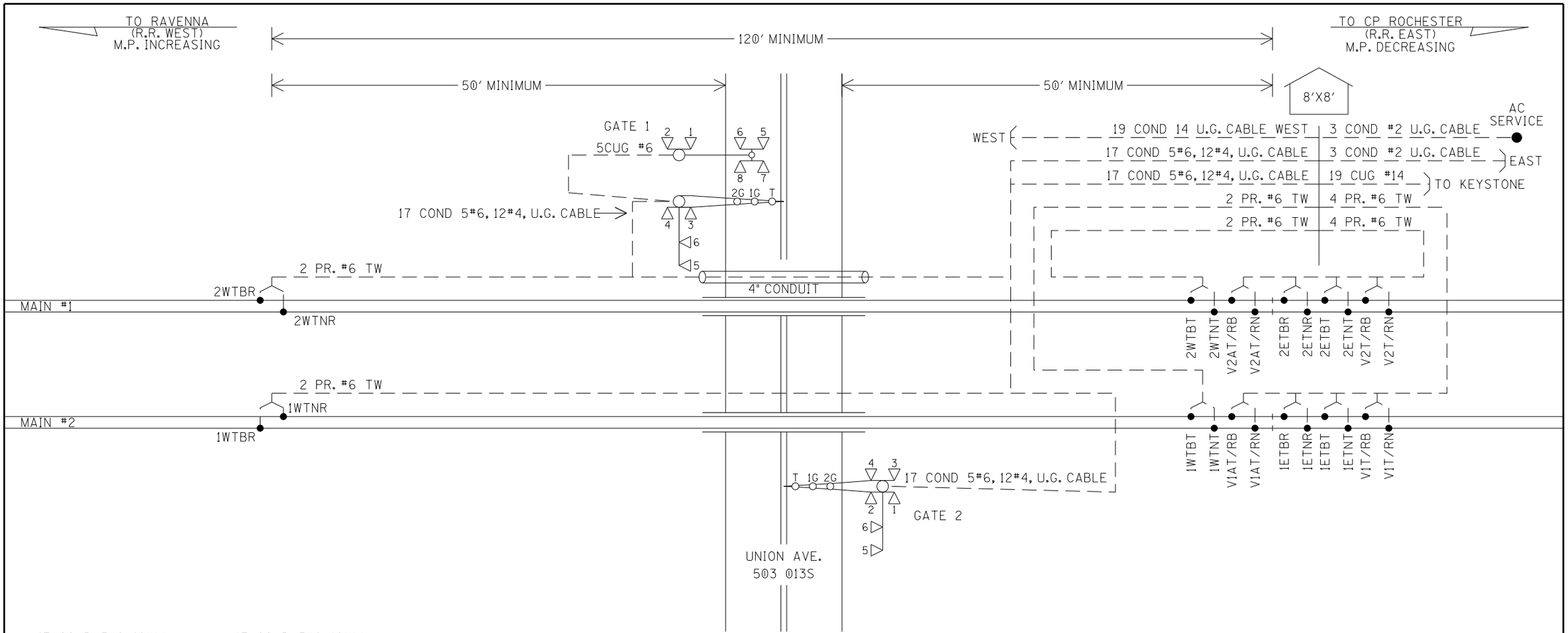
NOTE:
ALL SHUNTS AND DUMMY LOADS HAVE BEEN RELOCATED FROM THE TRACKS AND PLACED INTO ADJACENT BUNGALOWS.

PROFILE

DESIGNED BY:		NORFOLK SOUTHERN	
JWB	08-01-18	OFFICE OF ASS'T. VICE PRESIDENT COMM. & SIGNAL, ATLANTA, GA.	M.P.: RD-067.73
DRAWN BY:		ALLIANCE, OH CFLGS AT UNION AVE.	
IRE	08-01-18		
CHECKED BY:		CLEVELAND LINE	FILE No. R-
DBS	08-01-18	CADD or DWG. No. 24120677.02	SHEET No. 2 of 3
IN SERVICE:			
	- -		

REVISION INITIALS												

PROPERTY
PENNSYLVANIA R.R.



17 COND 5#6, 12#14, U.G. CABLE TO GATE 1
B16-A (B12)
SPARE
N16-A (N12)
AXG
SPARE
AXX
1AXX
NAXG
AEC (1XFE2)
XGP (1XGN)
XGP1 (1XGN1)
SPARE
SPARE
AEZ (1XFE1)
AGBX120 (G1HBX120)
AEB (N1XFE1)
AGNX120 (G1HNX120)

17 COND 5#6, 12#14, U.G. CABLE TO GATE 2
B16-B (B12)
BXG
N16-B (N12)
SPARE
SPARE
SPARE
SPARE
NBXG
BEC (2XFE2)
XGP1 (2XGN)
BXX
1BXX
SPARE
BEZ (2XFE1)
BGBX120 (G2HBX120)
BEB (N2XFE1)
BGNX120 (G2HNX120)

5CUG #6
AEC
AEZ
AEB
BELL
NBELL

3CUG #2
BX120A
BX120B
NEUTRAL

3CUG #2
BX120A
BX120B
NEUTRAL

2 PR. #6 TW
2WTBR
2WTNR

2 PR. #6 TW
1WTBR
1WTNR

2 PR. #6 TW
2WTBT
2WTNT

2 PR. #6 TW
1WTBT
1WTNT

4 PR. #6 TW
V1T/RB
V1T/RN
V2T/RB
V2T/RN
1ETBR
1ETNR
2ETBR
2ETNR

4 PR. #6 TW
V1AT/RB
V1AT/RN
V2AT/RB
V2AT/RN
1ETBT
1ETNT
2ETBT
2ETNT

CABLE PLAN

DESIGNED BY:	
JWB	08-01-18
DRAWN BY:	
IRE	08-01-18
CHECKED BY:	
DBS	08-01-18
IN SERVICE:	
	- -

NORFOLK SOUTHERN

OFFICE OF ASS'T. VICE PRESIDENT COMM. & SIGNAL, ATLANTA, GA. | M.P.: RD-067.73

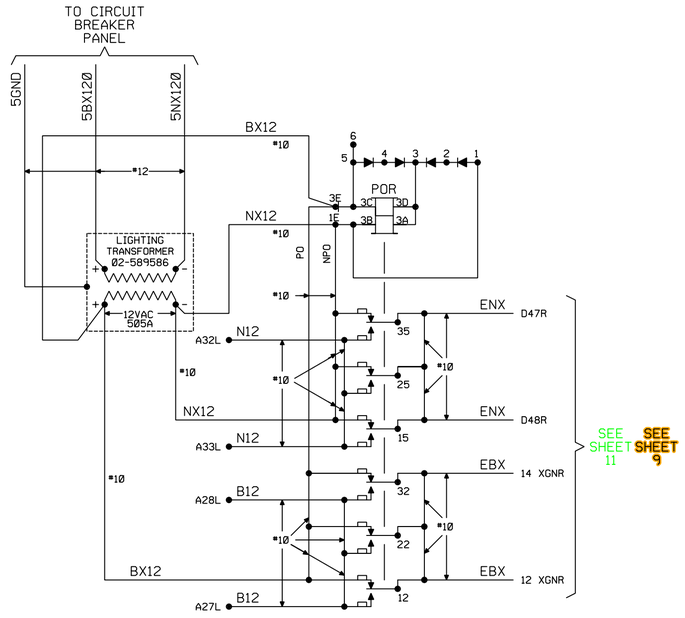
ALLIANCE, OH
CFLGS AT UNION AVE.

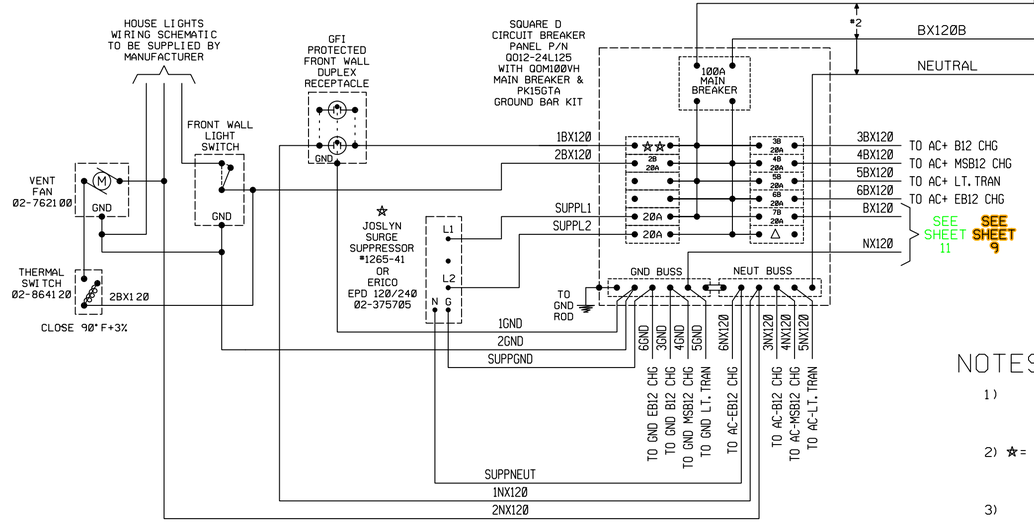
CLEVELAND LINE | FILE No. R-

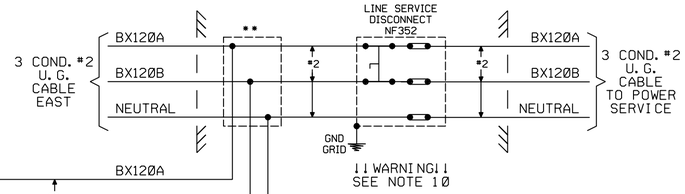
CADD or DWG. No. 24120677.03 | SHEET No. 3 of 3

REVISION INITIALS												

PROPERTY
NORFOLK SOUTHERN RAILWAY CO.



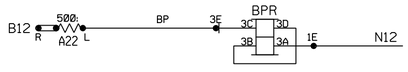




PER EXISTING PLANS IN FIELD
CHANGES WHERE MADE TO CIRCUITS
CHANGES WHERE NOT SHOWN
FIELD VERIFY CIRCUITS
AND MARK CHANGES FOR A.I.S.

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM



NOTES:

1) 3 CONDUCTOR #12 CABLE TO BE RUN TO EACH CHARGER, ETC FOR BX120, NX120 & GND.
2) ☆= SUPPRESSOR TO BE LOCATED AS CLOSE AS POSSIBLE TO MAIN BREAKER. LEADS TO BE TWISTED WHENEVER POSSIBLE.
3) 100A SERVICE REQUIRES #2 WIRE. 60A SERVICE REQUIRES #6 WIRE.
4) ALL AC POWER WIRING TO BE IN CONDUIT.
5) MAXIMUM BREAKER LOAD NOT TO EXCEED 80% OF RATING (IE. 20A BREAKER GOOD FOR 16A).
6) TRANSFORMER TO BE RATED AT 125% OF MAXIMUM LOAD.
7) TRANSFORMER TO BE PROTECTED BY CLASS RK5 FUSE BASED ON 125% OF KVA RATING.
8) Δ = 20A CIRCUIT BREAKER RESERVED FOR COMMUNICATIONS.
9) 480V AC POWER SOURCE MUST BE PROTECTED BY 30A FUSING AT FEED END.
10) LINE SERVICE DISCONNECT DOES NOT KILL LOCATION POWER. SHOP TO PROVIDE WARNING LABEL.
11) ** = TERMINATED IN POWER DISTRIBUTION BLOCK.

R = IF RECTIFIER CONTAINS D.C. VOLTAGE SENSING LEADS, RUN WIRES DIRECTLY TO BATTERY TERMINALS.

⊗ = TWISTED PAIR

REV	DATE	CKD BY
1	3-29-95	HEI
2	5-4-95	JFB

NORFOLK SOUTHERN

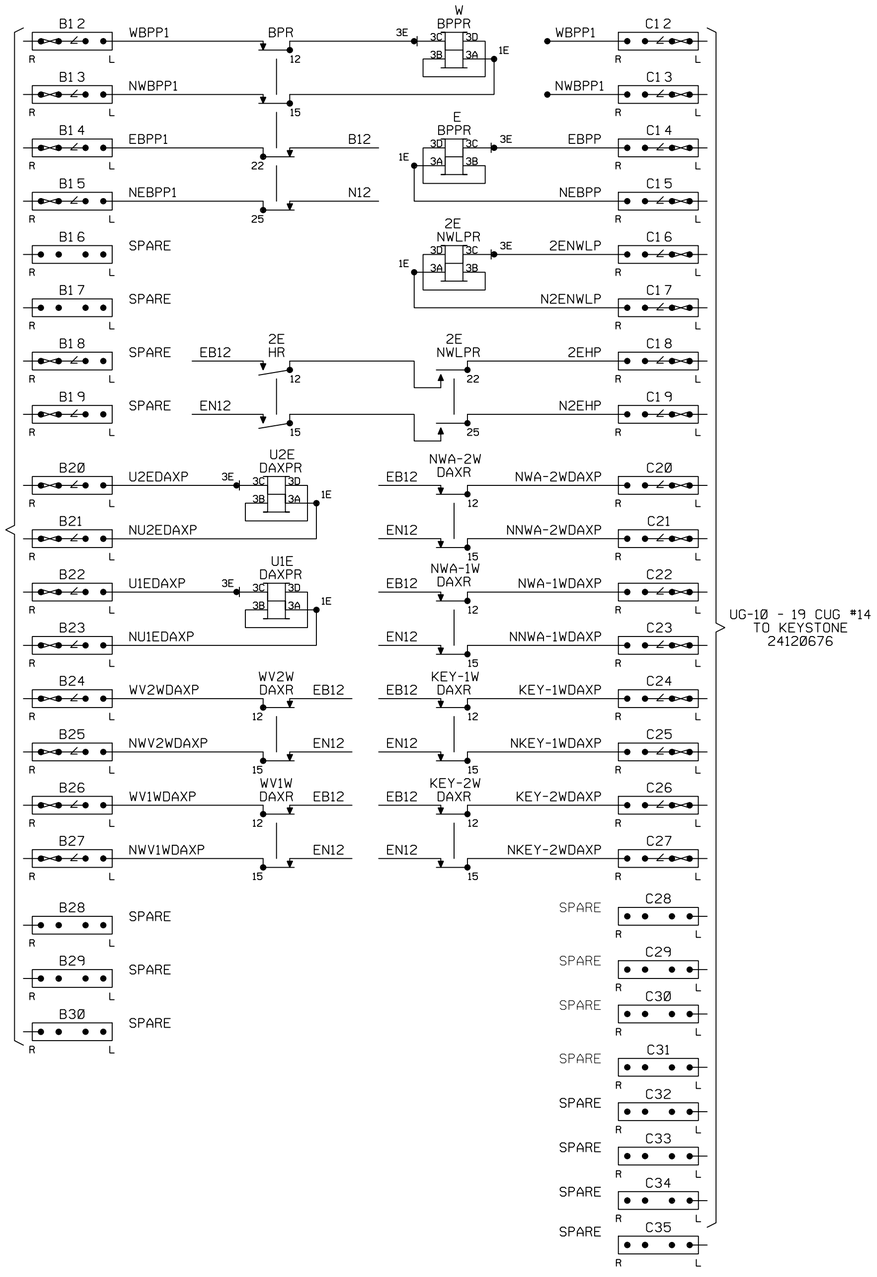
UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

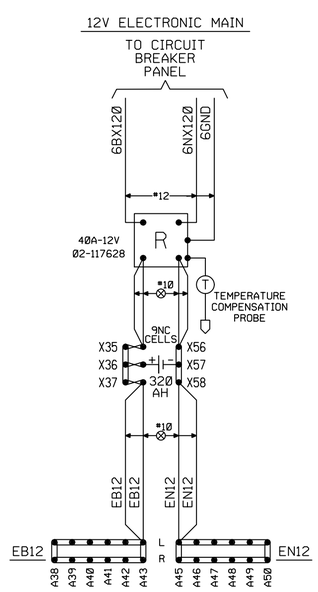
HIGHWAY CROSSING - REPEATER
POWER DISTRIBUTION CIRCUITS

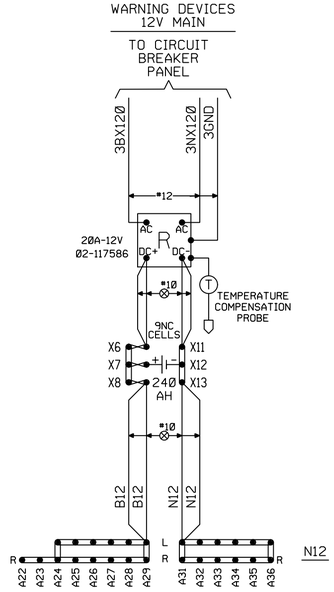
ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM REV. 43	09-04-13	SHEET 3

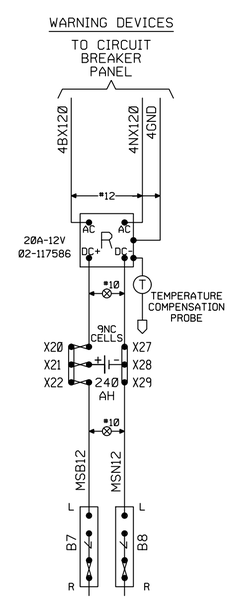
C&S CAD

24120677.03









PER EXISTING PLANS IN FIELD
CHANGES WHERE MADE TO CIRCUITS
CHANGES WHERE NOT SHOWN
FIELD VERIFY CIRCUITS
AND MARK CHANGES FOR A.I.S.

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

REV	DATE	CKD BY

C&S CAD

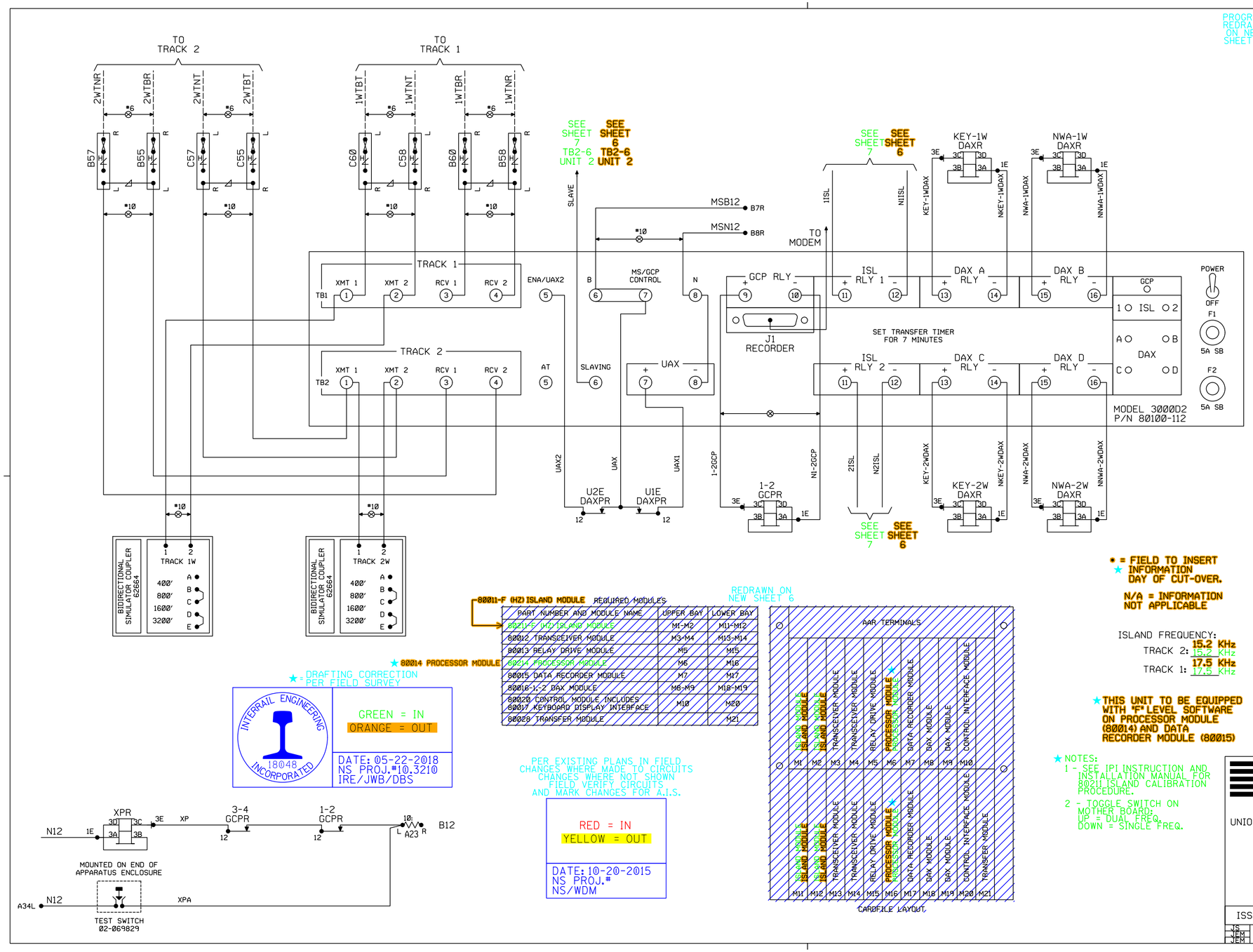
NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
POWER DISTRIBUTION
AND CABLE CIRCUITS

ISSUE DATE: APRIL 3, 1998			2412-0677
JS JEM JEM	REV. 43	09-04-13	SHEET 4

24120677.04



PROGRAM REDRAWN ON NEW SHEET 6

★SYSTEM PROGRAMMING PARAMETERS	
PROMPT	RESPONSE
NUMBER OF TRACKS	2 TRACK
FREQUENCY (MS/GCP)	211 Hz
UNI/BIDIRECTIONAL T1	BIDIRECTIONAL
UNI/BIDIRECTIONAL T2	BIDIRECTIONAL
XMIT LEVEL T1	MAX
XMIT LEVEL T2	MAX
PREDICTOR/MOTION SENSOR T1	PREDICTOR
PREDICTOR/MOTION SENSOR T2	PREDICTOR
WARNING TIME SELECTED T1	34 SEC.
WARNING TIME SELECTED T2	34 SEC.
APPROACH DIST. SELECTED T1	1970 FT.
APPROACH DIST. SELECTED T2	1970 FT.
APPROACH DIST. COMPUTED T1	N/A FT.
APPROACH DIST. COMPUTED T2	N/A FT.
UAX PICKUP DELAY(Ø=OFF)	25-SEC.
ENA/UAX2 PICKUP DELAY(Ø=ENA)	25-SEC.
NUMBER OF DAX'S	4
ISLAND DISTANCE T1	140 FT.
ISLAND DISTANCE T2	140 FT.
DAX A TRACK ASSIGNMENT	1
DAX A DISTANCE (Ø=PREEMPT)	540 FT.
DAX A WARNING TIME	30 SEC.
DAX B TRACK ASSIGNMENT	1
DAX B DISTANCE (Ø=PREEMPT)	1120 FT.
DAX B WARNING TIME	34 SEC.
DAX C TRACK ASSIGNMENT	2
DAX C DISTANCE (Ø=PREEMPT)	540 FT.
DAX C WARNING TIME	30 SEC.
DAX D TRACK ASSIGNMENT	2
DAX D DISTANCE (Ø=PREEMPT)	1120 FT.
DAX D WARNING TIME	34 SEC.
SLAVING MASTER/SLAVE	MASTER
PASSWORD ENABLED	DISABLED
RECORDER INSTALLED	INSTALLED
RS-232-C BAUD RATE	
RS-232-C DATA BITS	
RS-232-C STOP BITS	
RS-232-C PARITY	
DATE(E.G.,MON 16 NOV 1987)	•
TIME(E.G., 11:25:43 AM)	•
DAYLIGHT SAVINGS	ON/OFF
EXPANDED PROGRAMMING HISTORY	
SWITCH TO MS T1	10-EZ
SWITCH TO MS T2	10-EZ
TRANSFER DELAY MS TO GCP T1	Ø-SEC.
TRANSFER DELAY MS TO GCP T2	Ø-SEC.
PRIME PREDICTION OFFSET T1	Ø-FT.
PRIME PREDICTION OFFSET T2	Ø-FT.
PICKUP DELAY PRIME	15-SEC.
PICKUP DELAY DAX A	15-SEC.
PICKUP DELAY DAX B	15-SEC.
PICKUP DELAY DAX C	15-SEC.
PICKUP DELAY DAX D	15-SEC.
COMPENSATION VALUE T1	SET BY SYSTEM
COMPENSATION VALUE T2	SET BY SYSTEM
NUMBER OF TRACK WIRES T1	4 WIRES
NUMBER OF TRACK WIRES T2	4 WIRES

• = FIELD TO INSERT ★ INFORMATION DAY OF CUT-OVER.

N/A = INFORMATION NOT APPLICABLE

ISLAND FREQUENCY:
TRACK 2: 15.2 KHz (15.2 KHz)
TRACK 1: 17.5 KHz (17.5 KHz)

★THIS UNIT TO BE EQUIPPED WITH "F" LEVEL SOFTWARE ON PROCESSOR MODULE (80014) AND DATA RECORDER MODULE (80015)

★NOTES:
1 - SEE IPI INSTRUCTION AND INSTALLATION MANUAL FOR 8021F ISLAND CALIBRATION PROCEDURE.
2 - TOGGLE SWITCH ON MOTHER BOARD: UP = DUAL FREQ. DOWN = SINGLE FREQ.

80011-F (HZ) ISLAND MODULE REQUIRED MODULES

PART NUMBER AND MODULE NAME	UPPER BAY	LOWER BAY
80011-F (HZ) ISLAND MODULE	M1-M2	M11-M12
80012 TRANSCEIVER MODULE	M3-M4	M13-M14
80013 RELAY DRIVE MODULE	M5	M15
80014 PROCESSOR MODULE	M6	M16
80015 DATA RECORDER MODULE	M7	M17
80016-1,-2 DAX MODULE	M8-M9	M18-M19
80020 CONTROL MODULE INCLUDES 80017 KEYBOARD DISPLAY INTERFACE	M10	M20
80020 TRANSFER MODULE		M21

REDRAWN ON NEW SHEET 6

★ 80014 PROCESSOR MODULE

★ = DRAFTING CORRECTION PER FIELD SURVEY

INTERRAIL ENGINEERING 18048 INCORPORATED

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

PER EXISTING PLANS IN FIELD
CHANGES WHERE MADE TO CIRCUITS
CHANGES WHERE NOT SHOWN
FIELD VERIFY CIRCUITS
AND MARK CHANGES FOR A.I.S.

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
DUAL BIDIRECTIONAL GCP
MODEL 3000D2 02-806766
UNIT 1 (WEST)

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM REV. 543	09-04-13	SHEET 5

24120677.05

FIELD VERIFY PROGRAM LEVEL AND MARK FOR A.I.S.

3000D2 PROGRAMMING CHART	(LEVEL: J)
NUMBER OF TRACK TRANSCEIVERS	2
T1: FREQUENCY	211Hz
T2: FREQUENCY	211Hz
T1: UNIDIRECTIONAL/BIDIRECTIONAL	BI
T2: UNIDIRECTIONAL/BIDIRECTIONAL	BI
T1: XMIT LEVEL (MAX/MED)	MAX
T2: XMIT LEVEL (MAX/MED)	MAX
T1: PREDICTOR/MOTION SENSOR	PRED
T2: PREDICTOR/MOTION SENSOR	PRED
T1: WARNING TIME	34 Sec
T2: WARNING TIME	34 Sec
T1: APPROACH DISTANCE	1970 Ft
T2: APPROACH DISTANCE	1970 Ft
UAX1 PICKUP DELAY (UAX) (0 = OFF)	25 Sec
ENA/UAX2 DELAY (0 = ENA)	25 Sec
T1: ISLAND DISTANCE	140 Ft
T2: ISLAND DISTANCE	140 Ft
NUMBER OF DAX'S	4 Ea
DAX A TRACK ASSIGNMENT (T1/T2)	1
DAX A DISTANCE (0 = PREEMPT)	540 Ft
DAX A WARNING TIME	30 Sec
DAX B TRACK ASSIGNMENT (T1/T2)	1
DAX B DISTANCE (0 = PREEMPT)	1120 Ft
DAX B WARNING TIME	34 Sec
DAX C TRACK ASSIGNMENT (T1/T2)	2
DAX C DISTANCE (0 = PREEMPT)	540 Ft
DAX C WARNING TIME	30 Sec
DAX D TRACK ASSIGNMENT (T1/T2)	2
DAX D DISTANCE (0 = PREEMPT)	1120 Ft
DAX D WARNING TIME	34 Sec
SLAVING (MASTER/SLAVE)	MASTER
PASSWORD ENABLED	NO
RECORDER INSTALLED	NO

EXPANDED PROGRAMMING		
T1: SWITCH TO MS (ENTER EZ VALUE)	10 %	
T2: SWITCH TO MS (ENTER EZ VALUE)	10 %	
T1: TRANSFER DELAY MS TO GCP (0 = OFF)	0 Sec	
T2: TRANSFER DELAY MS TO GCP (0 = OFF)	0 Sec	
T1: TRANSFER MS TO GCP PRIME (ON/OFF)	---	(1)
T2: TRANSFER MS TO GCP PRIME (ON/OFF)	---	(1)
T1: TRANSFER MS TO GCP DAX A (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX A (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX B (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX B (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX C (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX C (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX D (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX D (ON/OFF)	---	(2)
T1: PRIME PREDICTION OFFSET (0 = OFF)	0 Ft	
T2: PRIME PREDICTION OFFSET (0 = OFF)	0 Ft	
PICKUP DELAY PRIME	15 Sec	
PICKUP DELAY DAX A	15 Sec	
PICKUP DELAY DAX B	15 Sec	
PICKUP DELAY DAX C	15 Sec	
PICKUP DELAY DAX D	15 Sec	
T1: ENHANCED DETECTION (ON/OFF)	OFF	
T2: ENHANCED DETECTION (ON/OFF)	OFF	
BACK-TO-BACK T1 AND T2 (NO/YES)	YES	(3)
T1: STATION STOP TIMER	10 Sec	(3)
T2: STATION STOP TIMER	10 Sec	(3)
T1: NUMBER OF TRACK WIRES (4/6)	4	
T2: NUMBER OF TRACK WIRES (4/6)	4	
T1: LOW EX ADJUSTMENT	0	
T2: LOW EX ADJUSTMENT	0	
T1: LOW EZ DETECTION	OFF	
T2: LOW EZ DETECTION	OFF	
T1: LOW EZ DETECTION TIMER (ON/OFF)	10 Min	(4)
T2: LOW EZ DETECTION TIMER (ON/OFF)	10 Min	(4)
T1: POSITIVE START (EZ LEVEL) (0 = OFF)	0	
T2: POSITIVE START (EZ LEVEL) (0 = OFF)	0	
T1: POSITIVE START TIMEOUT (0 = NONE)	0 Min	(5)
T2: POSITIVE START TIMEOUT (0 = NONE)	0 Min	(5)
SET AT OPERATION (NORMAL/DIAGNOSTIC)	NORMAL	
DIAGNOSTIC MESSAGES (ON/OFF)	ON	
DAX MESSAGES (ON/OFF)	ON	
ADVANCE PREEMPT TIMER (0 = OFF)	0	
T1: MOTION SENSING LEVEL (0 = NORMAL)	0 %	
T2: MOTION SENSING LEVEL (0 = NORMAL)	0 %	

3000D2 PROGRAMMING NOTES:

1) AVAILALBE WHEN "TRANSFER DELAY MS TO GCP" AND "PRIME PREDICTION OFFSET" IS ON
2) AVAILABLE WHEN "TRANSFER DELAY MS TO GCP" AND DAX DISTANCE IS GREATER THAN ZERO
3) AVAILABLE WHEN "ENHANCED DETECTION" IS ON
4) AVAILABLE WHEN "LOW EZ DETECTION" IS ON
5) AVAILABLE WHEN "POSITIVE START" IS ON

✳ = 1ST SLOT AT LEFT END OF BAY

MODEL 3000D2 GCP MODULE ASSEMBLIES																				
UPPER BAY										LOWER BAY										
MODULES POSITION	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21
MODULE NUMBERS	80211-f(1) ✳ ISL	80211-f(2) ISL	80012 T/R 1	80012 T/R 2	80013 RLY DRV	80214 PROCS	80015 REC-INTF	80016 (1) DAX	80016 (2) DAX	80020 +80017	80211-f(1) ✳ ISL	80211-f(2) ISL	80012 T/R 1	80012 T/R 2	80013 RLY DRV	80214 PROCS	80015 REC-INTF	80016 (1) DAX	80016 (2) DAX	80020 +80017	80028 XFRTMR
MODULES USED	X	X	X	X	X	X	X **	X	X	X	X	X	X	X	X	X	X **	X	X	X	X

NOTES:

1 - SEE IPI INSTRUCTION AND INSTALLATION MANUAL FOR 80211 ISLAND CALIBRATION PROCEDURE.

2 - TOGGLE SWITCH ON MOTHER BOARD:
UP = DUAL FREQ.
DOWN = SINGLE FREQ.

** = 80214 & 80255 (WITH JUMPER) CARDS AND E-LEVEL OR LATER SOFTWARE NEEDED FOR SEAR II / ECHELON CAPABILITIES.

THIS SHEET IS DRAFTING CORRECTION PER FIELD SURVEY FIELD VERIFY PROGRAMMED AS SHOWN AND MARK FOR A.I.S.

NORFOLK SOUTHERN

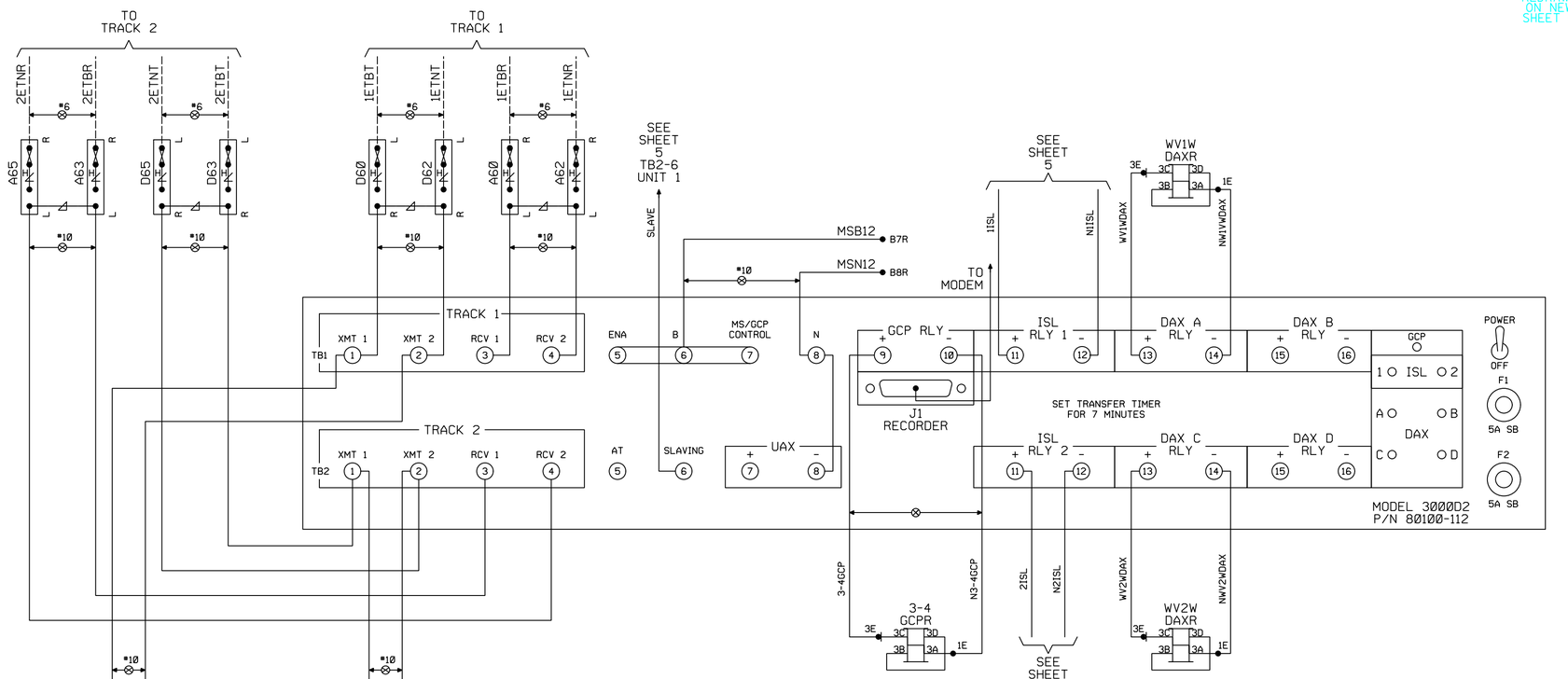
UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
DUAL BIDIRECTIONAL GCP
MODEL 3000D2 02-806766
UNIT 1 (WEST)

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM REV. 5	09-04-13	SHEET 6

24120677.06

PROGRAM REDRAWN ON NEW SHEET 6



★ SYSTEM PROGRAMMING PARAMETERS	
PROMPT	RESPONSE
NUMBER OF TRACKS	2 TRACK
FREQUENCY (MS/GCP)	211 Hz
UNI/BIDIRECTIONAL T1	BIDIRECTIONAL
UNI/BIDIRECTIONAL T2	BIDIRECTIONAL
XMIT LEVEL T1	MAX
XMIT LEVEL T2	MAX
PREDICTOR/MOTION SENSOR T1	PREDICTOR
PREDICTOR/MOTION SENSOR T2	PREDICTOR
WARNING TIME SELECTED T1	34 SEC.
WARNING TIME SELECTED T2	34 SEC.
APPROACH DIST. SELECTED T1	2450 FT.
APPROACH DIST. SELECTED T2	2450 FT.
APPROACH DIST. COMPUTED T1	N/A FT.
APPROACH DIST. COMPUTED T2	N/A FT.
UAX PICKUP DELAY(Ø=OFF)	Ø-SEC.
ENA/UAX2 PICKUP DELAY(Ø=ENA)	25-SEC.
NUMBER OF DAX'S	2
ISLAND DISTANCE T1	Ø FT.
ISLAND DISTANCE T2	Ø FT.
DAX A TRACK ASSIGNMENT	1
DAX A DISTANCE (Ø=PREEMPT)	312 FT.
DAX A WARNING TIME	30 SEC.
DAX B TRACK ASSIGNMENT	N/A
DAX B DISTANCE (Ø=PREEMPT)	N/A FT.
DAX B WARNING TIME	N/A SEC.
DAX C TRACK ASSIGNMENT	2
DAX C DISTANCE (Ø=PREEMPT)	312 FT.
DAX C WARNING TIME	30 SEC.
DAX D TRACK ASSIGNMENT	N/A
DAX D DISTANCE (Ø=PREEMPT)	N/A FT.
DAX D WARNING TIME	N/A SEC.
SLAVING MASTER/SLAVE	SLAVE
PASSWORD ENABLED	DISABLED
RECORDER INSTALLED	INSTALLED
RS-232-C BAUD RATE	
RS-232-C DATA BITS	
RS-232-C STOP BITS	
RS-232-C PARITY	
DATE (E.G.,MON 8 JUNE 1987)	*
TIME (E.G., 11:25:43 AM)	*
DAYLIGHT SAVINGS	ON/OFF
EXPANDED PROGRAMMING HISTORY	
SWITCH TO MS T1	10-EZ
SWITCH TO MS T2	10-EZ
TRANSFER DELAY MS TO GCP T1	Ø-SEC.
TRANSFER DELAY MS TO GCP T2	Ø-SEC.
PRIME PREDICTION OFFSET T1	Ø-FT.
PRIME PREDICTION OFFSET T2	Ø-FT.
PICKUP DELAY PRIME	15-SEC.
PICKUP DELAY DAX A	15-SEC.
PICKUP DELAY DAX B	15-SEC.
PICKUP DELAY DAX C	15-SEC.
PICKUP DELAY DAX D	15-SEC.
COMPENSATION VALUE T1	SET BY SYSTEM
COMPENSATION VALUE T2	SET BY SYSTEM
NUMBER OF TRACK WIRES T1	4 WIRES
NUMBER OF TRACK WIRES T2	4 WIRES

* = FIELD TO INSERT ★ INFORMATION DAY OF CUT-OVER.

N/A = INFORMATION NOT APPLICABLE

ISLAND FREQUENCY:
TRACK 2: N/A
TRACK 1: N/A

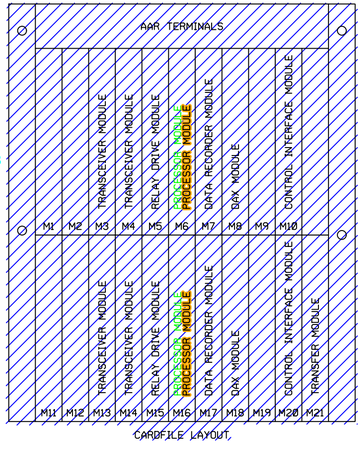
★ THIS UNIT TO BE EQUIPPED WITH "F" LEVEL SOFTWARE ON PROCESSOR MODULE (80014) AND DATA RECORDER MODULE (80015)

★ NOTES:
1 - SEE IPI INSTRUCTION AND INSTALLATION MANUAL FOR 8021I ISLAND CALIBRATION PROCEDURE.
2 - TOGGLE SWITCH ON MOTHER BOARD: UP = DUAL FREQ. DOWN = SINGLE FREQ.

REQUIRED MODULES

PART NUMBER AND MODULE NAME	UPPER BAY	LOWER BAY
80011-F (HZ) ISLAND MODULE	NONE	NONE
80012 TRANSCEIVER MODULE	M3-M4	M13-M14
80013 RELAY DRIVE MODULE	M5	M15
★ 80014 PROCESSOR MODULE	M6	M16
80015 DATA RECORDER MODULE	M7	M17
80016 1-2 DAX MODULE	M8	M18
80020 CONTROL MODULE INCLUDES 80017 KEYBOARD DISPLAY INTERFACE	M10	M20
80028 TRANSFER MODULE		M21

REDRAWN ON NEW SHEET 8



★ = DRAFTING CORRECTION PER FIELD SURVEY

INTERRAIL ENGINEERING INCORPORATED 18048

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

PER EXISTING PLANS IN FIELD
CHANGES WHERE MADE TO CIRCUITS
CHANGES WHERE NOT SHOWN
FIELD VERIFY CIRCUITS
AND MARK CHANGES FOR A.I.S.

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
DUAL BIDIRECTIONAL GCP
MODEL 3000D2 02-806766
UNIT 2 (EAST)

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM	REV. 43	09-04-13	SHEET 76

24120677.07
24120677.06

FIELD VERIFY PROGRAM LEVEL AND MARK FOR A.I.S.

3000D2 PROGRAMMING CHART	(LEVEL: J)
NUMBER OF TRACK TRANSCEIVERS	2
T1: FREQUENCY	211Hz
T2: FREQUENCY	211Hz
T1: UNIDIRECTIONAL/BIDIRECTIONAL	BI
T2: UNIDIRECTIONAL/BIDIRECTIONAL	BI
T1: XMIT LEVEL (MAX/MED)	MAX
T2: XMIT LEVEL (MAX/MED)	MAX
T1: PREDICTOR/MOTION SENSOR	PRED
T2: PREDICTOR/MOTION SENSOR	PRED
T1: WARNING TIME	34 Sec
T2: WARNING TIME	34 Sec
T1: APPROACH DISTANCE	1970 Ft
T2: APPROACH DISTANCE	1970 Ft
UAX1 PICKUP DELAY (UAX) (0 = OFF)	25 Sec
ENA/UAX2 DELAY (0 = ENA)	25 Sec
T1: ISLAND DISTANCE	140 Ft
T2: ISLAND DISTANCE	140 Ft
NUMBER OF DAX'S	4 Ea
DAX A TRACK ASSIGNMENT (T1/T2)	1
DAX A DISTANCE (0 = PREEMPT)	540 Ft
DAX A WARNING TIME	30 Sec
DAX B TRACK ASSIGNMENT (T1/T2)	1
DAX B DISTANCE (0 = PREEMPT)	1120 Ft
DAX B WARNING TIME	34 Sec
DAX C TRACK ASSIGNMENT (T1/T2)	2
DAX C DISTANCE (0 = PREEMPT)	540 Ft
DAX C WARNING TIME	30 Sec
DAX D TRACK ASSIGNMENT (T1/T2)	2
DAX D DISTANCE (0 = PREEMPT)	1120 Ft
DAX D WARNING TIME	34 Sec
SLAVING (MASTER/SLAVE)	MASTER
PASSWORD ENABLED	NO
RECORDER INSTALLED	NO

EXPANDED PROGRAMMING

T1: SWITCH TO MS (ENTER EZ VALUE)	10 %	
T2: SWITCH TO MS (ENTER EZ VALUE)	10 %	
T1: TRANSFER DELAY MS TO GCP (0 = OFF)	0 Sec	
T2: TRANSFER DELAY MS TO GCP (0 = OFF)	0 Sec	
T1: TRANSFER MS TO GCP PRIME (ON/OFF)	---	(1)
T2: TRANSFER MS TO GCP PRIME (ON/OFF)	---	(1)
T1: TRANSFER MS TO GCP DAX A (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX A (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX B (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX B (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX C (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX C (ON/OFF)	---	(2)
T1: TRANSFER MS TO GCP DAX D (ON/OFF)	---	(2)
T2: TRANSFER MS TO GCP DAX D (ON/OFF)	---	(2)
T1: PRIME PREDICTION OFFSET (0 = OFF)	0 Ft	
T2: PRIME PREDICTION OFFSET (0 = OFF)	0 Ft	
PICKUP DELAY PRIME	15 Sec	
PICKUP DELAY DAX A	15 Sec	
PICKUP DELAY DAX B	15 Sec	
PICKUP DELAY DAX C	15 Sec	
PICKUP DELAY DAX D	15 Sec	
T1: ENHANCED DETECTION (ON/OFF)	OFF	
T2: ENHANCED DETECTION (ON/OFF)	OFF	
BACK-TO-BACK T1 AND T2 (NO/YES)	YES	(3)
T1: STATION STOP TIMER	10 Sec	(3)
T2: STATION STOP TIMER	10 Sec	(3)
T1: NUMBER OF TRACK WIRES (4/6)	4	
T2: NUMBER OF TRACK WIRES (4/6)	4	
T1: LOW EX ADJUSTMENT	0	
T2: LOW EX ADJUSTMENT	0	
T1: LOW EZ DETECTION	OFF	
T2: LOW EZ DETECTION	OFF	
T1: LOW EZ DETECTION TIMER (ON/OFF)	10 Min	(4)
T2: LOW EZ DETECTION TIMER (ON/OFF)	10 Min	(4)
T1: POSITIVE START (EZ LEVEL) (0 = OFF)	0	
T2: POSITIVE START (EZ LEVEL) (0 = OFF)	0	
T1: POSITIVE START TIMEOUT (0 = NONE)	0 Min	(5)
T2: POSITIVE START TIMEOUT (0 = NONE)	0 Min	(5)
SET AT OPERATION (NORMAL/DIAGNOSTIC)	NORMAL	
DIAGNOSTIC MESSAGES (ON/OFF)	ON	
DAX MESSAGES (ON/OFF)	ON	
ADVANCE PREEMPT TIMER (0 = OFF)	0	
T1: MOTION SENSING LEVEL (0 = NORMAL)	0 %	
T2: MOTION SENSING LEVEL (0 = NORMAL)	0 %	

3000D2 PROGRAMMING NOTES:

1) AVAILALBE WHEN "TRANSFER DELAY MS TO GCP" AND "PRIME PREDICTION OFFSET" IS ON
2) AVAILABLE WHEN "TRANSFER DELAY MS TO GCP" AND DAX DISTANCE IS GREATER THAN ZERO
3) AVAILABLE WHEN "ENHANCED DETECTION" IS ON
4) AVAILABLE WHEN "LOW EZ DETECTION" IS ON
5) AVAILABLE WHEN "POSITIVE START" IS ON

✳ = 1ST SLOT AT LEFT END OF BAY

MODEL 3000D2 GCP MODULE ASSEMBLIES																					
UPPER BAY											LOWER BAY										
MODULES POSITION	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21
MODULE NUMBERS	80211-f(1) ✳ ISL	80211-f(2) ISL	80012 T/R 1	80012 T/R 2	80013 RLY DRV	80214 PROCS	80015 REC-INTF	80016 (1) DAX	80016 (2) DAX	80020 +800017	80211-f(1) ✳ ISL	80211-f(2) ISL	80012 T/R 1	80012 T/R 2	80013 RLY DRV	80214 PROCS	80015 REC-INTF	80016 (1) DAX	80016 (2) DAX	80020 +800017	80028 XFRTMR
MODULES USED			X	X	X	X	X **	X		X			X	X	X	X	X **	X		X	X

NOTES:

1 - SEE IPI INSTRUCTION AND INSTALLATION MANUAL FOR 80211 ISLAND CALIBRATION PROCEDURE.

2 - TOGGLE SWITCH ON MOTHER BOARD:
UP = DUAL FREQ.
DOWN = SINGLE FREQ.

** = 80214 & 80255 (WITH JUMPER) CARDS AND E-LEVEL OR LATER SOFTWARE NEEDED FOR SEAR II / ECHELON CAPABILITIES.

THIS SHEET IS DRAFTING CORRECTION PER FIELD SURVEY
FIELD VERIFY PROGRAMMED AS SHOWN AND MARK FOR A.I.S.

NORFOLK SOUTHERN

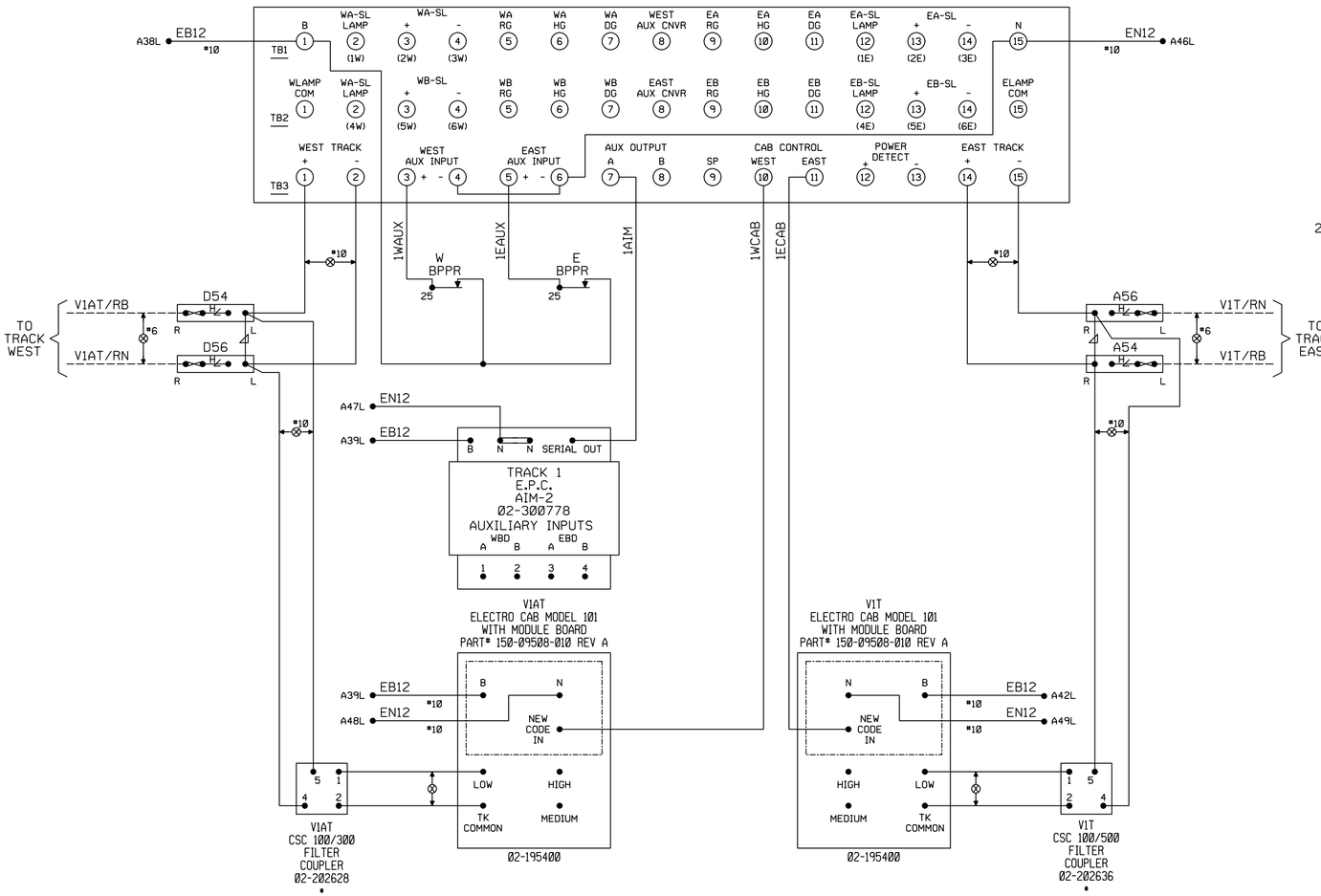
UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
DUAL BIDIRECTIONAL GCP
MODEL 3000D2 02-806766
UNIT 1 (WEST)

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM REV. 5	09-04-13	SHEET 8

24120677.08

ELECTRO CODE MODEL 4R
WITH INTERNAL CSF100 FILTER



NOTES:

1.) BOARD LAYOUT (WITH INTERNAL CSF100 FILTER)

ELECTRO CODE MODEL 4R
REGENERATIVE REPEATER
ASSIGNED PROGRAM I.D. CRAEQ
CHASSIS I.D. STRAPPING: 34

1	2	3	4	5	6	7	9	12	13
7K TRACK RECEIVER	2R REGULATED TRACK CONVERTER	214 FILTER	215D AUXILIARY	216 DISPLAY	220A PROCESSOR	220B PROCESSOR	UNUSED	2R REGULATED TRACK CONVERTER	7K TRACK RECEIVER

SLOTS 8, 10 & 11 UNUSED

2.) CODES

ELECTRO CODE 4 CODES EASTBOUND

V1AT		TRACK 1		V1T	
CAB OUT	CODE OUT	USAGE	TYPE	TRK CAB	CODE IN
0	1	TRACK	SEMI-VTL	0	1
0	2	BLOCK CLEAR	VITAL	0	2
75	3	APPROACH WITH CAB	VITAL	75	3
120	4	APPROACH MEDIUM	VITAL	120	4
0	5	BLOCK INDICATION	NONVITAL	0	5
0	6	TUMBLEDOWN	NONVITAL	0	6
180	7	CLEAR	VITAL	180	7
0	1	CAB TURN ON	VITAL	0	8
0	9	APPROACH W/O CAB	VITAL	0	9
(NO STICK CAPABILITY)					

ELECTRO CODE 4 CODES WESTBOUND

V1AT		TRACK 1		V1T	
CODE IN	TRK CAB	TYPE	USAGE	CODE OUT	CAB OUT
1	0	SEMI-VTL	TRACK	1	0
2	75	VITAL	BLOCK CLEAR	2	75
3	75	VITAL	APPROACH WITH CAB	4	120
4	120	VITAL	APPROACH MEDIUM	4	120
5	0	NONVITAL	BLOCK INDICATION	5	0
6	0	NONVITAL	TUMBLEDOWN	6	0
7	180	VITAL	CLEAR	7	180
8	0	VITAL	CAB TURN ON	1	0
9	0	VITAL	APPROACH W/O CAB	9	0
(NO STICK CAPABILITY)					

3.) CODE 5 SELECT SWITCHES

S1

EAST	C1	4 OPEN
	C5	3 CLOSED
WEST	C1	2 OPEN
	C5	1 OPEN

LOCATED ON 215 MODULE
(REPEATS CODE 5)

4.) • = MOUNT FILTER COUPLER ADJACENT TO ELECTRO CAB 101.

5.) ( ) = COLORLIGHT NOMENCLATURE.

6.) 215D MODULE (WIRED AS OLD 215B CARD)
JUMPER B REMOVED A,C&D LEFT ON.

7.) AIM-2 JUMPERS (TIED TO B12 WHEN HIGH)

(A,B)	STICK	CODE UPGRADES			
(0,0)	NO	0 → 0	75 → 75	120 → 120	180 → 180
(0,1)	YES	0 → 0	75 → 75	120 → 120	180 → 180
(1,0)	YES	0 → 0	75 → 75	120 → 180	180 → 180
(1,1)	YES	0 → 75	75 → 180	120 → 180	180 → 180

NOTE:
ELECTRO CODE 4 UNIT HAS INTERNAL STICKS
WITH CAB UPGRADE CAPABILITY.

REV	DATE	CKD BY

C&S CAD

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
ELECTROCODE 4 CIRCUITS
TRACK 1

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM	REV. 3	09-04-13	SHEET 97

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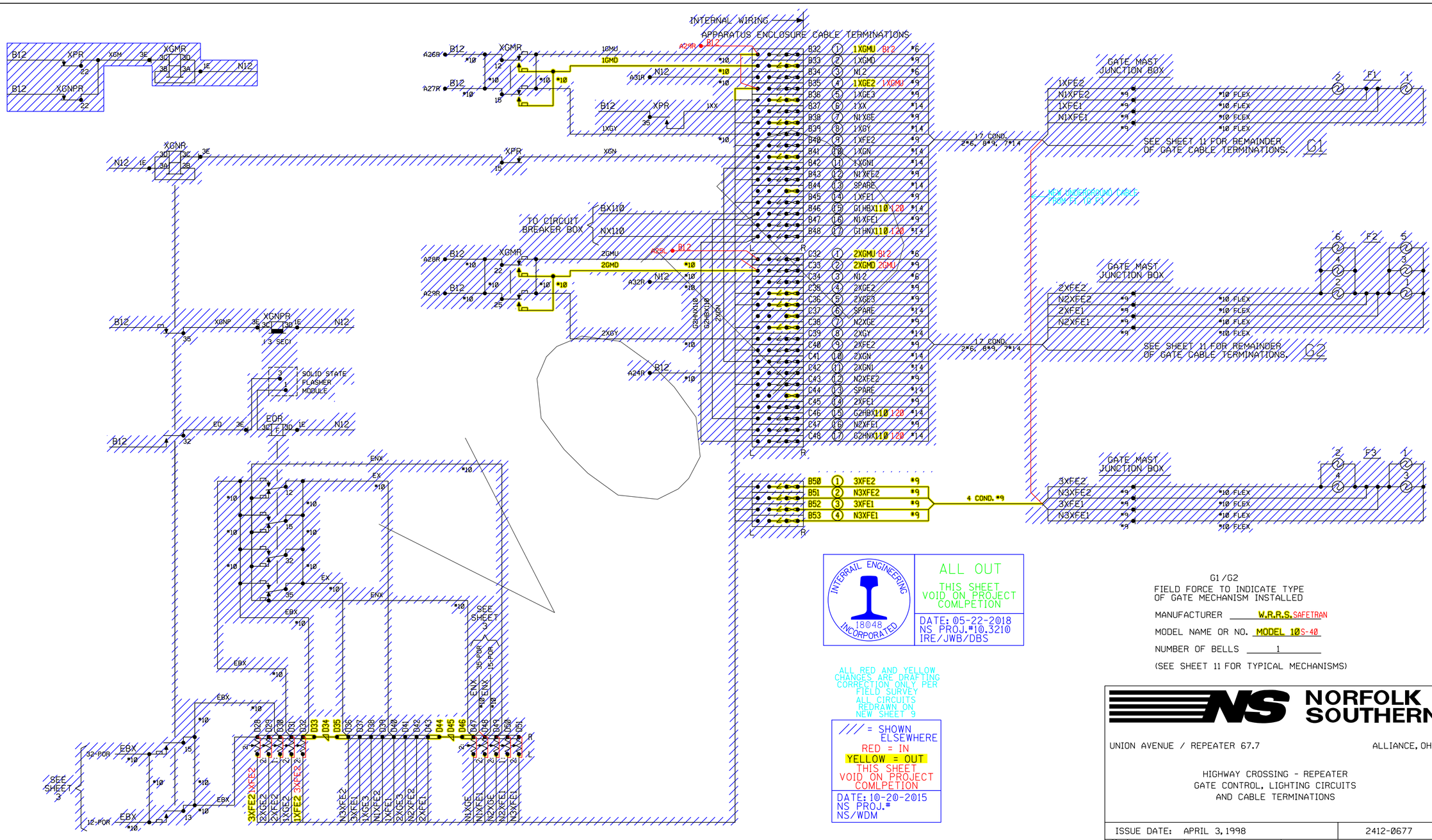

REV	DATE	CKD BY
1	5-21-91	ELE
1	5-21-91	RAK
2	3-29-95	HEI

ALL OUT
THIS SHEET VOID ON PROJECT COMLPETION
DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

INTERRAIL ENGINEERING 18048 INCORPORATED

ALL RED AND YELLOW CHANGES ARE DRAFTING CORRECTION ONLY PER FIELD SURVEY
ALL CIRCUITS REDRAWN ON NEW SHEET 9

= SHOWN ELSEWHERE
RED = IN
YELLOW = OUT
THIS SHEET VOID ON PROJECT COMLPETION
DATE: 10-20-2015
NS PROJ.#
NS/WDM

G1/G2
FIELD FORCE TO INDICATE TYPE OF GATE MECHANISM INSTALLED

MANUFACTURER W.R.R.S. SAFETRAN

MODEL NAME OR NO. MODEL 10 S-40

NUMBER OF BELLS 1

(SEE SHEET 11 FOR TYPICAL MECHANISMS)

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
GATE CONTROL, LIGHTING CIRCUITS
AND CABLE TERMINATIONS

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM REV. 43	09-04-13	SHEET 9

C&S CAD

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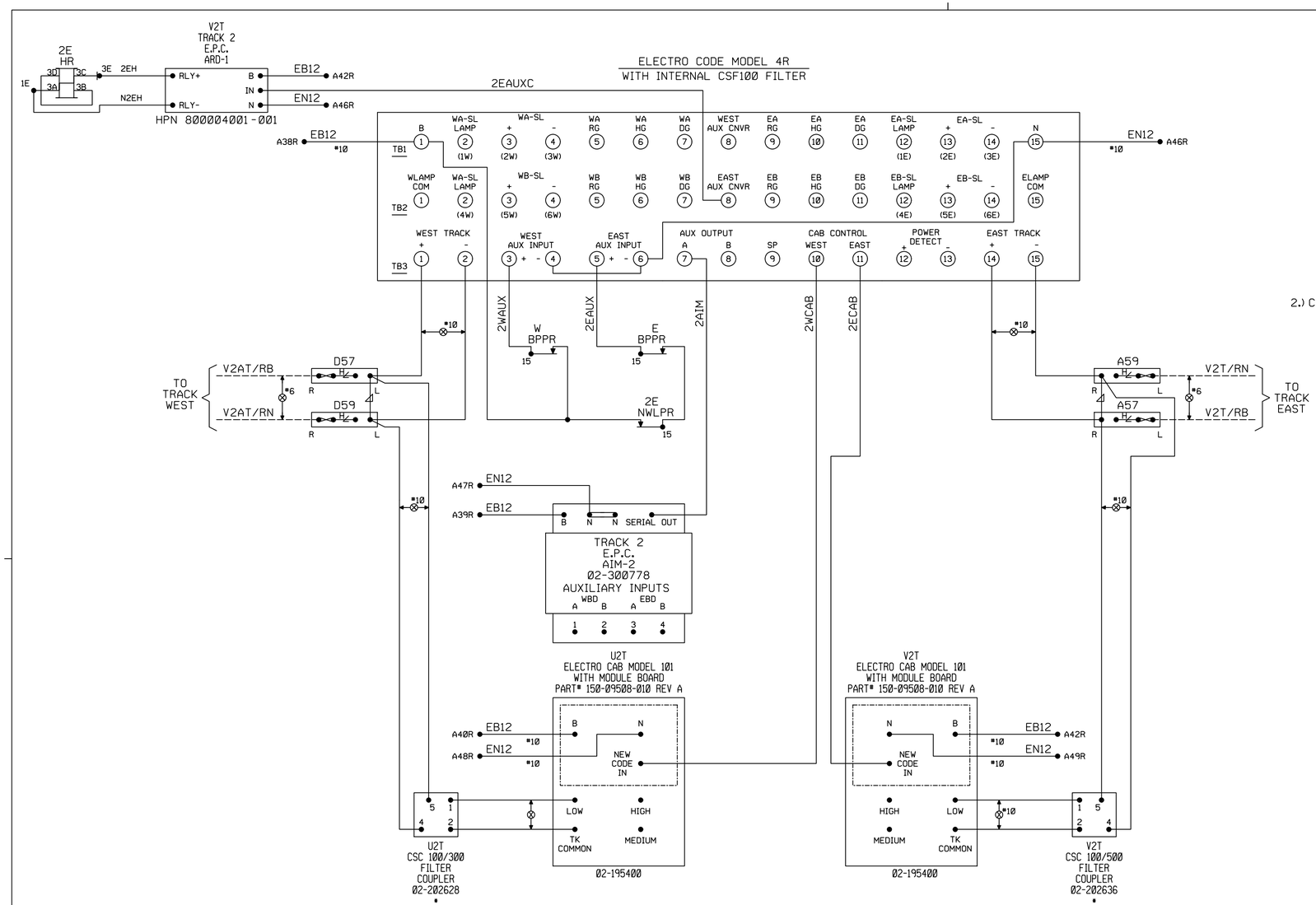

NOTES:

1.) BOARD LAYOUT (WITH INTERNAL CSF100 FILTER)

ELECTRO CODE MODEL 4R REGENERATIVE REPEATER ASSIGNED PROGRAM I.D. CRAEQ CHASSIS I.D. STRAPPING: 34										
1	2	3	4	5	6	7	9	12	13	
7K TRACK RECEIVER	2R REGULATED TRACK CONVERTER	214 FILTER	215D AUXILIARY	216 DISPLAY	220A PROCESSOR	220B PROCESSOR	212A CHOPPER CNTRL	2R REGULATED TRACK CONVERTER	7K TRACK RECEIVER	
SLOTS 8, 10 & 11 UNUSED										

2.) CODES

ELECTRO CODE 4 CODES EASTBOUND

U2T		TRACK 2		V2T	
CAB OUT	CODE OUT	USAGE	TYPE	TRK CAB	CODE IN
0	1	TRACK	SEMI-VTL	0	1
0	2	BLOCK CLEAR	VITAL	0	2
75	3	APPROACH WITH CAB	VITAL	75	3
120	4	APPROACH MEDIUM	VITAL	120	4
0	5	BLOCK INDICATION	NONVITAL	0	5
0	6	TUMBLEDOWN	NONVITAL	0	6
180	7	CLEAR	VITAL	180	7
0	1	CAB TURN ON	VITAL	0	8
0	9	APPROACH W/O CAB	VITAL	0	9
(NO STICK CAPABILITY)					

ELECTRO CODE 4 CODES WESTBOUND

U2T		TRACK 2		V2T	
CODE IN	TRK CAB	TYPE	USAGE	CODE OUT	CAB OUT
1	0	SEMI-VTL	TRACK	1	0
2	180	VITAL	BLOCK CLEAR	2	180
3	75	VITAL	APPROACH WITH CAB	3	75
4	120	VITAL	APPROACH MEDIUM	4	120
5	0	NONVITAL	BLOCK INDICATION	5	0
6	0	NONVITAL	TUMBLEDOWN	6	0
7	180	VITAL	CLEAR	7	180
8	0	VITAL	CAB TURN ON	1	0
9	0	VITAL	APPROACH W/O CAB	9	0
(NO STICK CAPABILITY)					

3.) CODE 5 SELECT SWITCHES

S1

EAST	C1	4 OPEN
	C5	3 CLOSED
WEST	C1	2 OPEN
	C5	1 OPEN

LOCATED ON 215 MODULE

(REPEATS CODE 5)

4.) * = MOUNT FILTER COUPLER ADJACENT TO ELECTRO CAB 101.

5.) ( ) = COLORLIGHT NOMENCLATURE.

6.) 215D MODULE (WIRED AS OLD 215B CARD) JUMPER B REMOVED A,C&D LEFT ON.

7.) AIM-2 JUMPERS (TIED TO B12 WHEN HIGH)

(A,B)	STICK	CODE UPGRADES			
(0,0)	NO	0 → 0	75 → 75	120 → 120	180 → 180
(0,1)	YES	0 → 0	75 → 75	120 → 120	180 → 180
(1,0)	YES	0 → 0	75 → 75	120 → 180	180 → 180
(1,1)	YES	0 → 75	75 → 180	120 → 180	180 → 180

NOTE:

ELECTRO CODE 4 UNIT HAS INTERNAL STICKS WITH CAB UPGRADE CAPABILITY.

REV	DATE	CKD BY

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
ELECTROCODE 4 CIRCUITS
TRACK 2

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM REV. 3	09-04-13	SHEET 10 8

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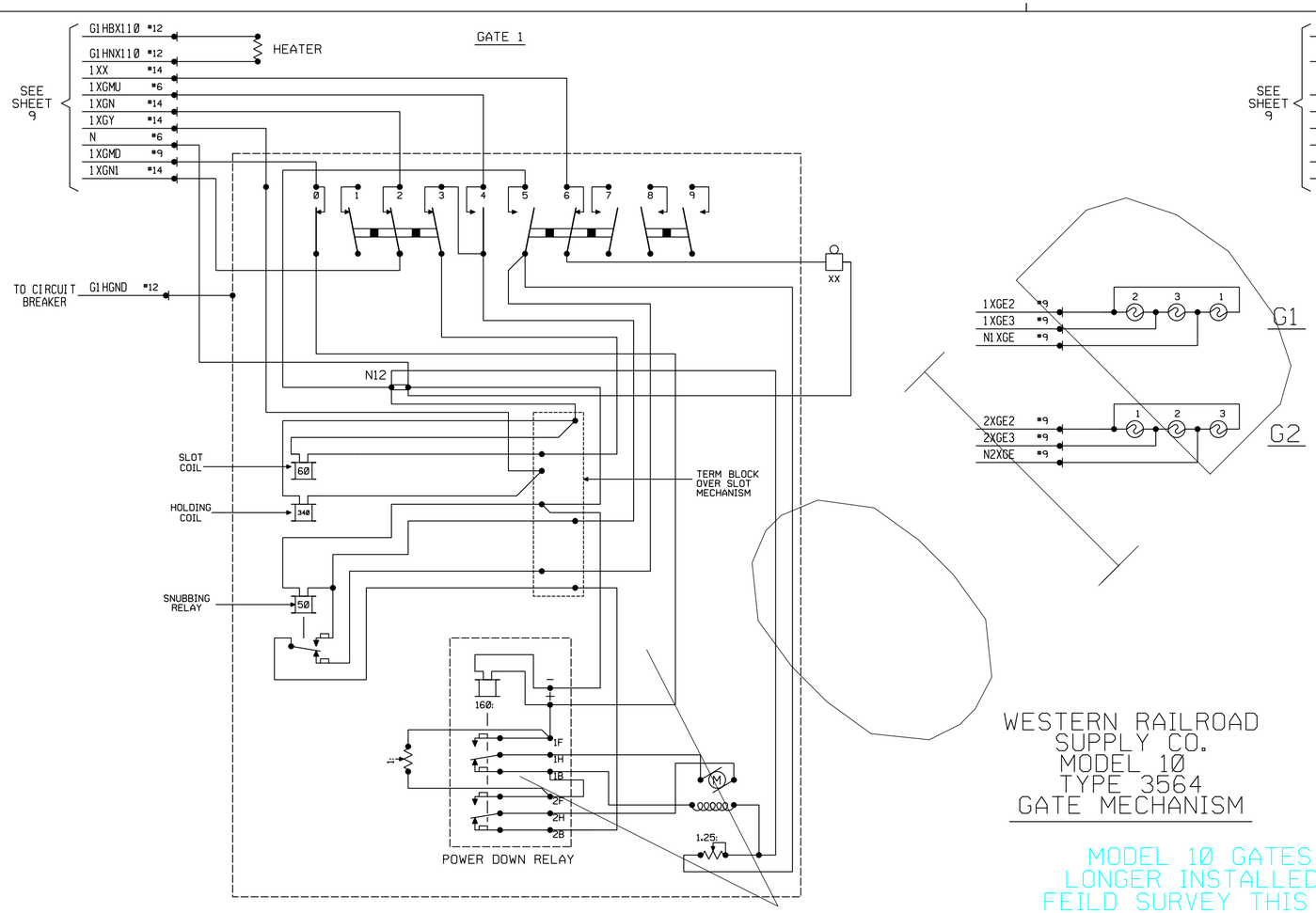

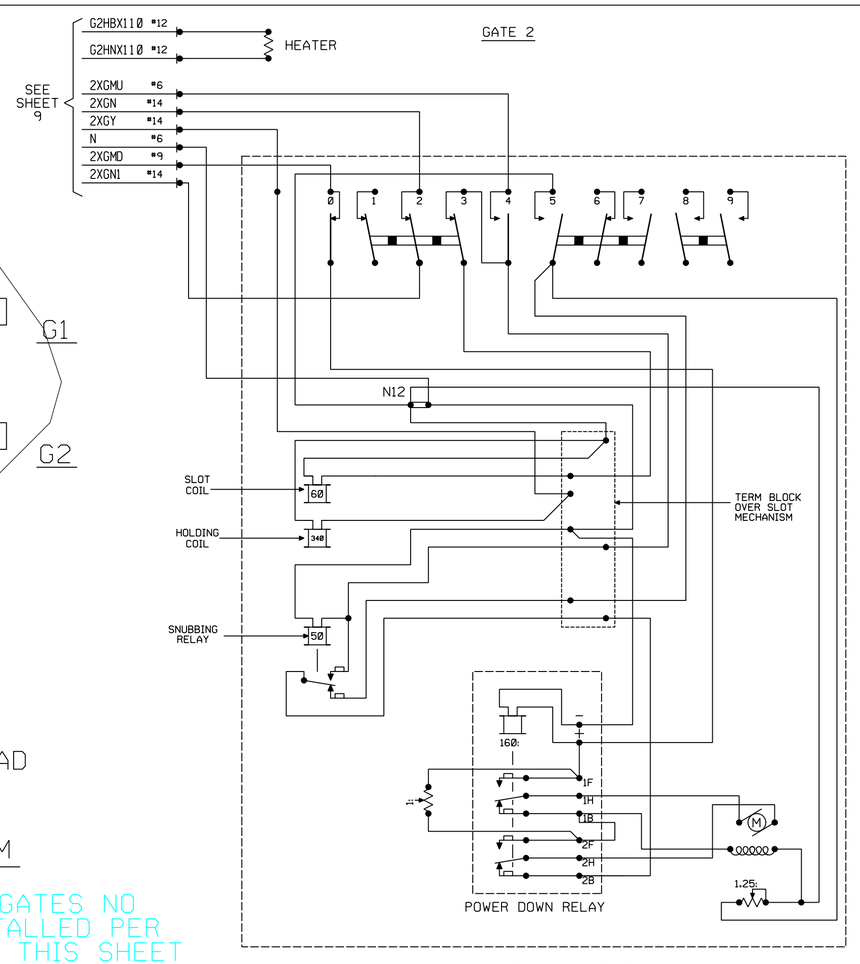

(SEE NOTE FOR G2)

WESTERN RAILROAD SUPPLY CO. MODEL 10 TYPE 3564 GATE MECHANISM

MODEL 10 GATES NO LONGER INSTALLED PER FEILD SURVEY THIS SHEET IS VOID FOR FILE MANAGEMENT ONLY

CIRCUIT CONTROLLER FUNCTIONS			
SPACE NUMBER	USE OF CONTROLLER	CONTACT OPERATION	
		CONTACT CLOSED	CAM DRIVES CONTACT
0	TO OPEN MOTOR CIRCUIT DOWN	46° TO 93°	OPEN
1	SPARE	86° TO 93°	CLOSED
2	TO CONTROL OF RELAY XGNR	86° TO 93°	CLOSED
3	TO PULL SLOT MAGNET	86° TO 93°	CLOSED
4	TO CUT OFF MOTOR AFTER GATE HAS CLEARED	0° TO 89° 83° TO 0°	CLOSED
5	TO CLOSE HEAVY SNUB CIRCUIT AS GATE ARM APPROACHES HORIZONTAL	0° TO 10°	CLOSED
6	TO OPEN BELL CIRCUIT WHEN GATE IS HORIZONTAL	5° TO 93°	OPEN
7	SPARE	0° TO 5°	CLOSED
8	SPARE	0° TO 89°	OPEN
9	SPARE	0° TO 89°	OPEN

NOTES:

WIRES BETWEEN BATTERY AND GATE MOTOR SHALL NOT BE SMALLER THAN NO. 6 A.W.G. WHERE TOTAL LENGTH OF WIRE IN CIRCUIT, BATTERY, AND COMMON SIDE, EXCEEDS 120' USE NO. 6 A.W.G. OR EQUIVALENT UP TO 240'.

THE FOLLOWING NUMBER OF CELLS ARE RECOMMENDED:

GATE ARM LENGTH IN FEET	NO. OF LEAD TYPE CELLS	NO. OF NICKEL-IRON TYPE CELLS
UP TO 24	6	10
25 TO 34	7	11

MECHANISMS SHOWN FOR GATE ARMS IN VERTICAL POSITION. EACH HIGHWAY GATE TO BE WIRED SAME AS SHOWN, EXCEPT FOR LIGHTS (SEE DIAGRAM G2). SIDEWALK ARMS ON HIGHWAY GATES TO HAVE STEADY-LIT LIGHT. 2XGN1 IN G2 WILL BECOME B12.

THIS SHEET VOID ON PROJECT COMLPETION
DATE: 10-20-2015
NS PROJ.#
NS/WDM

REV	DATE	CKD BY

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
WRRS MODEL 10 TYPE 3564 GATE CIRCUITS

ISSUE DATE: APRIL 3, 1998		2412-0677
JS JEM JEM REV. 3	09-04-13	SHEET 10

C&S CAD

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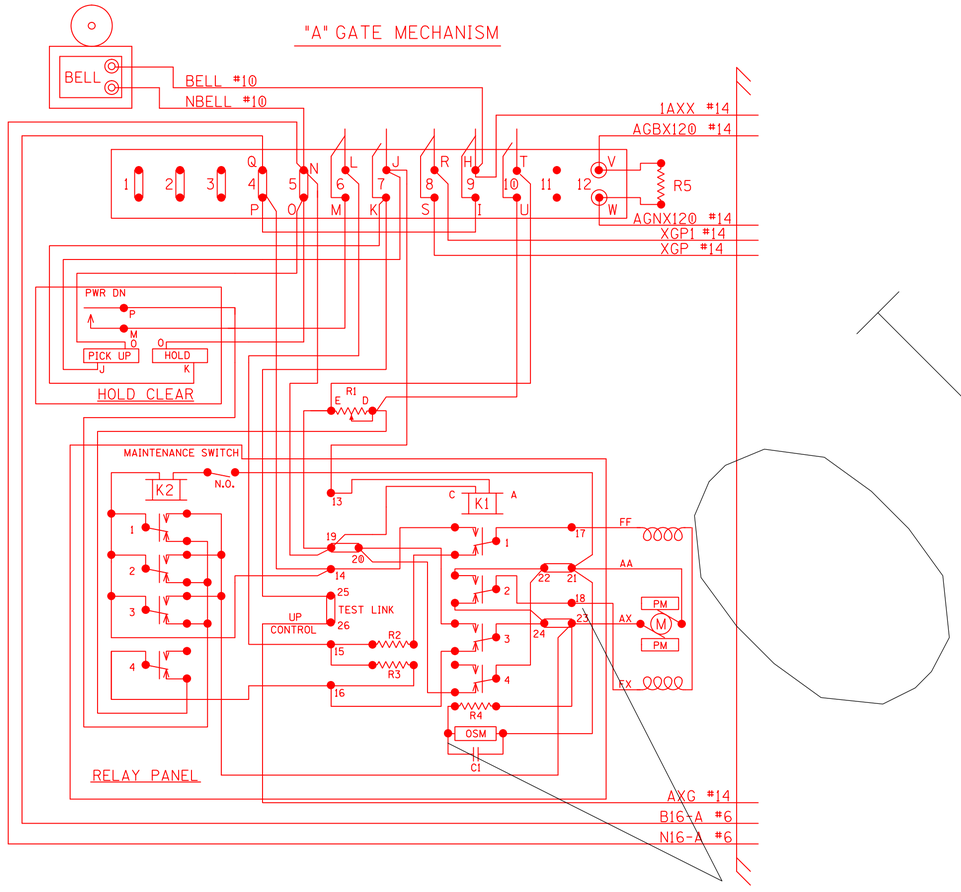

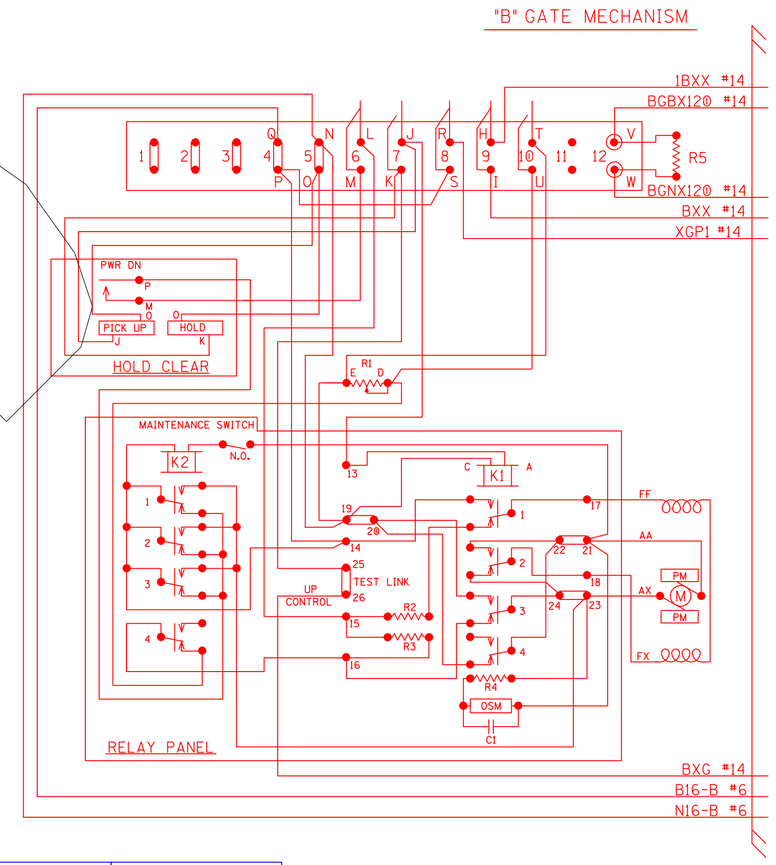

DRAFTING CORRECTION
PER FIELD SURVEY
S-40 GATES ARE
CURRENTLY INSTALLED

RED = IN

DATE: 10-20-2015
NS PROJ.#
NS/WDM

INTERRAIL ENGINEERING 18048 INCORPORATED

ALL OUT
THIS SHEET
VOID ON PROJECT
COMLPETION

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

SAFETRAN MODEL "S40" GATE

CONTACT SPACE	CONTACT CLOSED AT	FUNCTION OF CONTACT
(6) L-M	45°-90°	POWER DOWN CONTROL
(7) J-K	0°-89°	POWER UP CONTROL
(8) R-S	83°-90°	FLASHING LGT. CONTROL
(9) H-I	5°-90°	BELL CONTROL
(10) T-U	0°-5°	HORIZONTAL SNUB

"A" FLASHER AND GATE LIGHTS WITH MODEL "S40" GATE MECHANISM

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
WRRS MODEL 10 TYPE 3564 GATE CIRCUITS

REV	DATE	CKD BY

ISSUE DATE: APRIL 3, 1998 — 2412-0677

JS
JEM
JEM

REV. 43 — 09-04-13 — SHEET 10

C&S CAD

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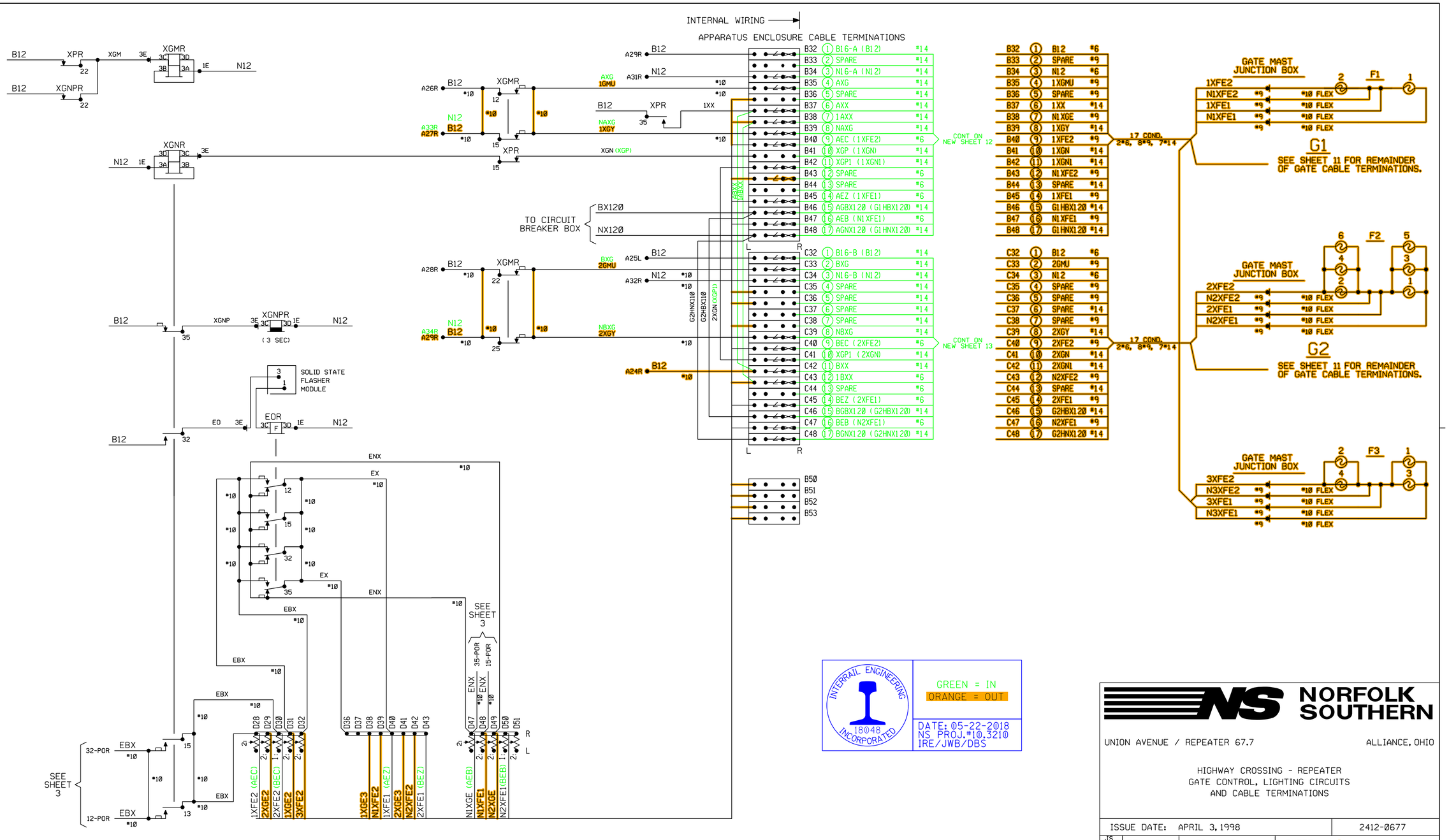
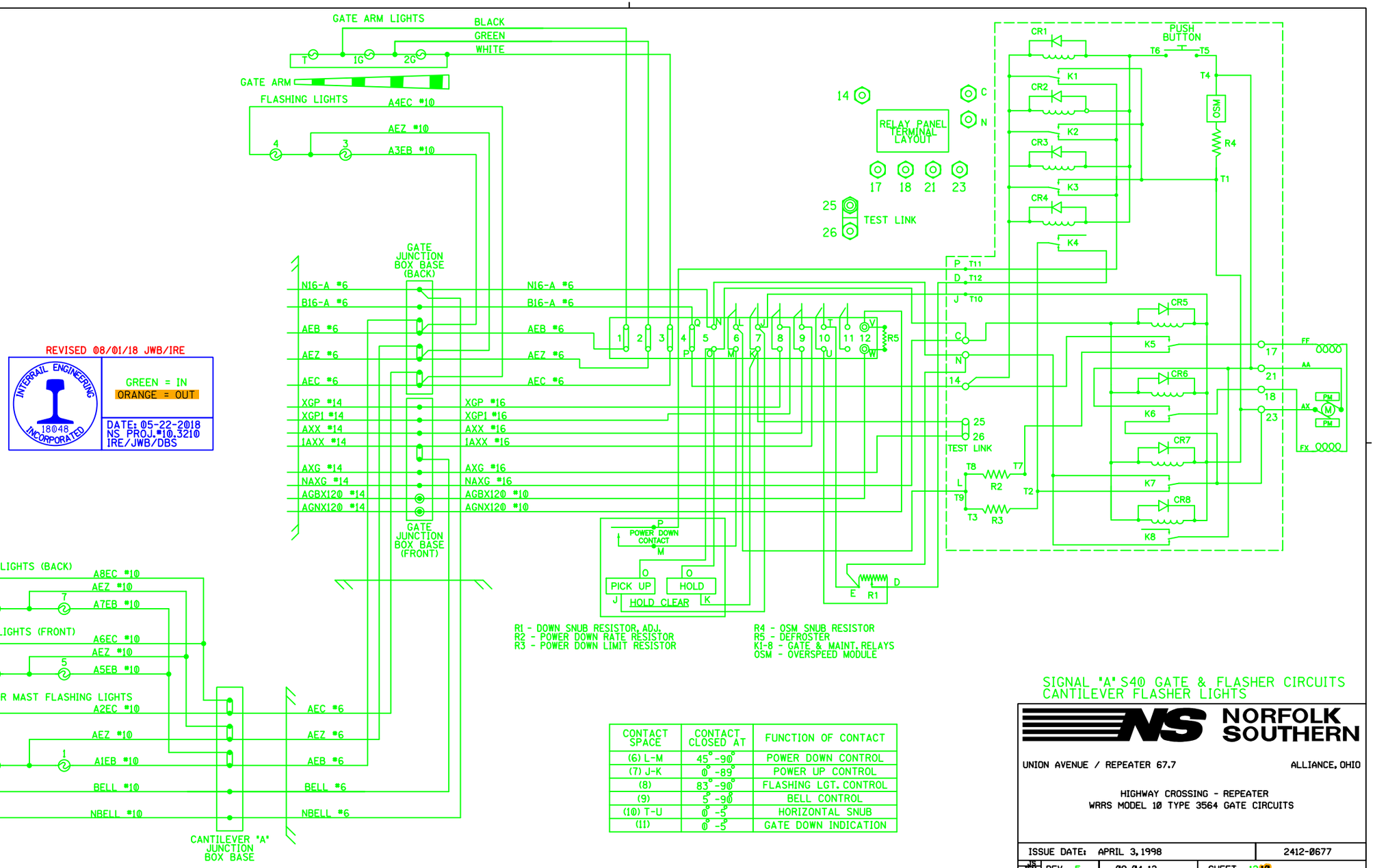


REV	DATE	CKD BY
1	5-21-91	ELE
1	5-21-91	RAK
2	3-29-95	HEI

C&S CAD



REVISED 08/01/18 JWB/IRE

INTERRAIL ENGINEERING 18048 INCORPORATED

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR

R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1-8 - GATE & MAINT. RELAYS
OSM - OVERSPEED MODULE

CONTACT SPACE	CONTACT CLOSED AT	FUNCTION OF CONTACT
(6) L-M	45°-90°	POWER DOWN CONTROL
(7) J-K	0°-89°	POWER UP CONTROL
(8)	83°-90°	FLASHING LGT. CONTROL
(9)	5°-90°	BELL CONTROL
(10) T-U	0°-5°	HORIZONTAL SNUB
(11)	0°-5°	GATE DOWN INDICATION

REV	DATE	CKD BY

C&S CAD

SIGNAL "A" S40 GATE & FLASHER CIRCUITS CANTILEVER FLASHER LIGHTS

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
WRRS MODEL 10 TYPE 3564 GATE CIRCUITS

ISSUE DATE: APRIL 3, 1998		2412-0677
NS VER. REV. 5	09-04-13	SHEET 12 10

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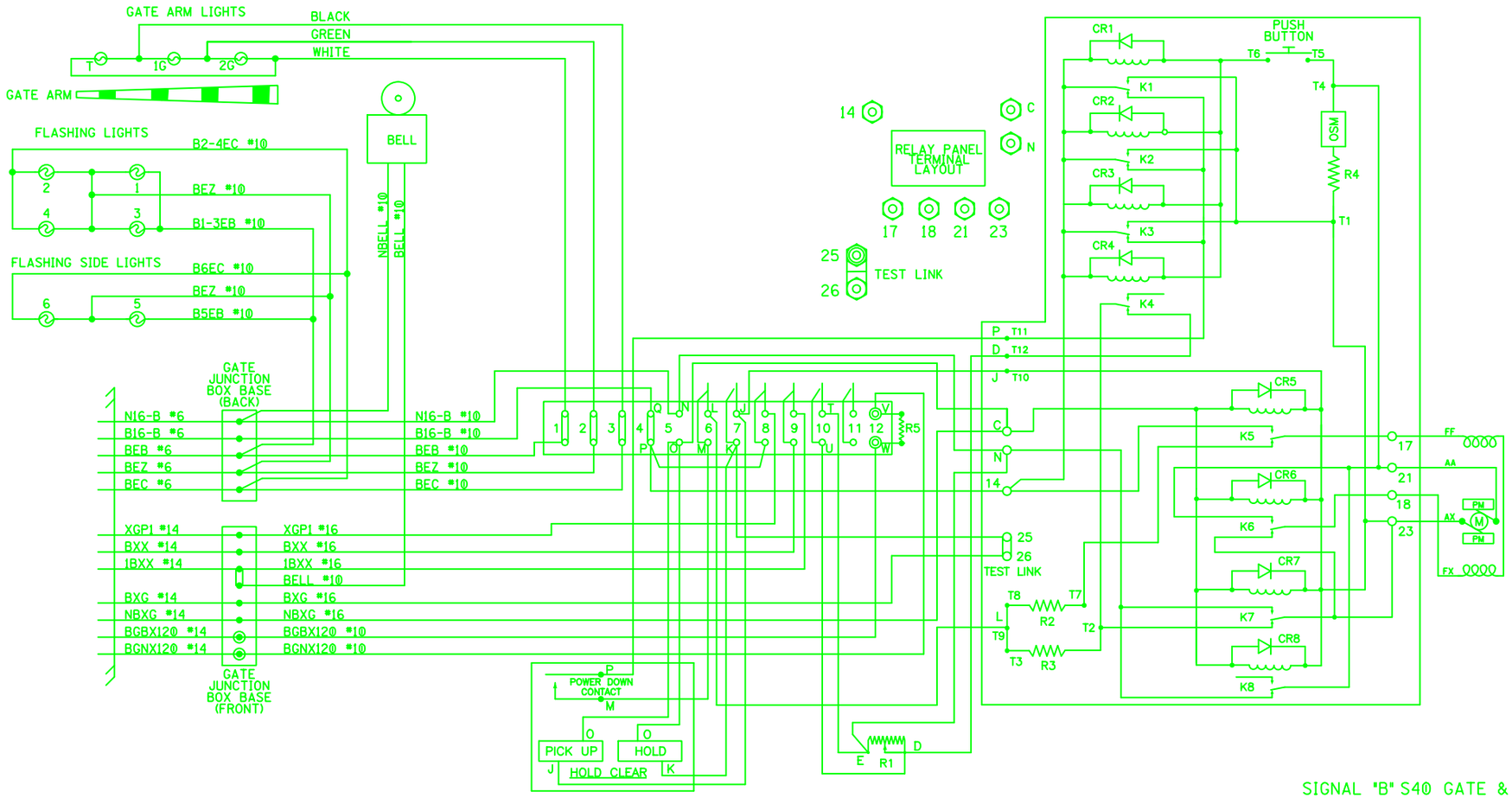
24120677.10



R1 - DOWN SNUB RESISTOR ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR

R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1-8 - GATE & MAINT. RELAYS
OSM - OVERSPEED MODULE

REV	DATE	CKD BY

CONTACT SPACE	CONTACT CLOSED AT	FUNCTION OF CONTACT
(6) L-M	45°-90°	POWER DOWN CONTROL
(7) J-K	0°-89°	POWER UP CONTROL
(8)	83°-90°	FLASHING LGT. CONTROL
(9)	5°-90°	BELL CONTROL
(10) T-U	0°-5°	HORIZONTAL SNUB
(11)	0°-5°	GATE DOWN INDICATION

C&S CAD

REVISED 08/01/18 JWB/IRE

INTERRAIL ENGINEERING INCORPORATED 18048

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10.3210
IRE/JWB/DBS

SIGNAL "B" S40 GATE & FLASHER CIRCUITS

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
WRRS MODEL 10 TYPE 3564 GATE CIRCUITS

ISSUE DATE: APRIL 3, 1998		2412-0677
NS VER. REV. 5	09-04-13	SHEET 13

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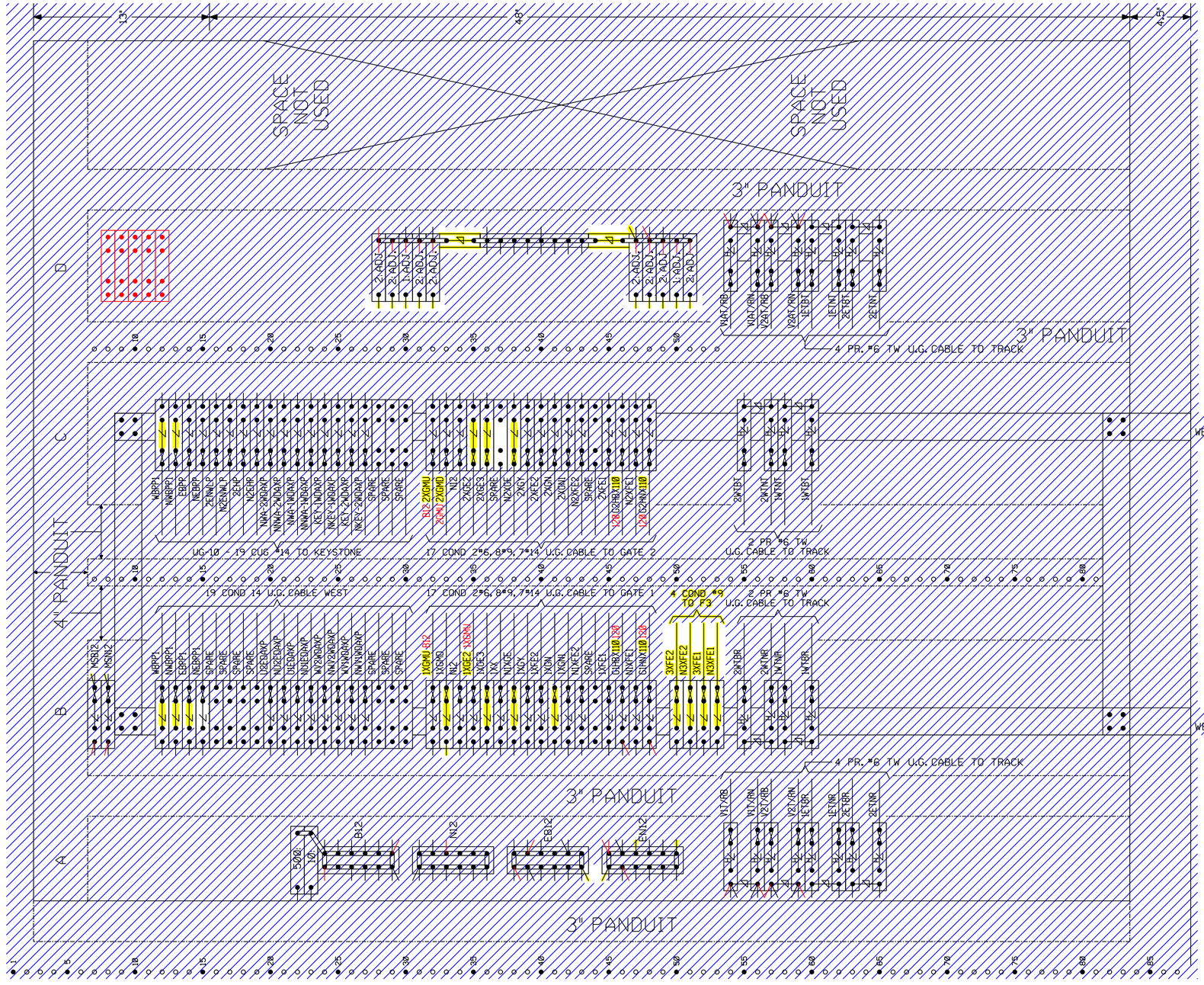


NOTES:

1	FIXED	02-423547 - RESISTOR
1	ADJ.	02-425799 - RESISTOR
2	ADJ.	02-425807 - RESISTOR
5	ADJ.	02-422754 - RESISTOR
10	FIXED	SAFETRAN 029245-3X - RESISTOR
22	FIXED	02-425849 - RESISTOR
100	FIXED	02-423646 - RESISTOR
500	FIXED	02-423711 - RESISTOR
		02-036133 - 4 POST PORCELAIN BASE
		02-037057 - 3 POST PORCELAIN BASE
		02-050753 - TERMINAL BLOCK FOR EQUALIZER
		02-048757 - TERMIMAL STRIP
		02-150009 - BUSS LINK
		02-286662 - TEST LINK ASSEMBLY
		02-025920 - ARRESTER, HEAVY DUTY, WITH BASE
		02-026613 - ARRESTER, HEAVY DUTY, WITHOUT BASE
		02-025565 - ARRESTER
		02-197950 - EQUALIZER
	GROUND BUSS WELDED TO FLOOR	GROUND CONNECTION TO BE IN ACCORDANCE WITH STANDARD PLAN CS-9001-A

ALL RED AND YELLOW CHANGES ARE DRAFTING CORRECTION ONLY PER FIELD SURVEY
ALL REDRAWN ON NEW SHEET 14

= SHOWN ELSEWHERE
RED = IN
YELLOW = OUT
THIS SHEET VOID ON PROJECT COMLPETION

DATE: 10-20-2015
NS PROJ.#
NS/WDM

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
TERMINAL BOARD ARRANGEMENT

ISSUE DATE: APRIL 3, 1998		2412-0677
REV. 43	09-04-13	SHEET 13

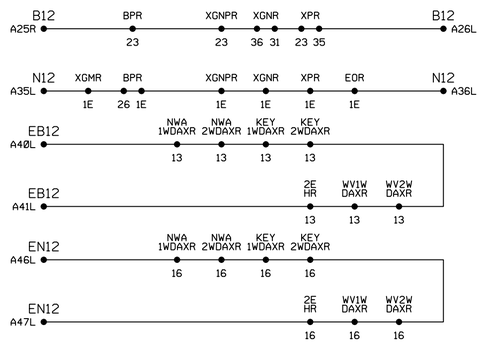
24120677.13V

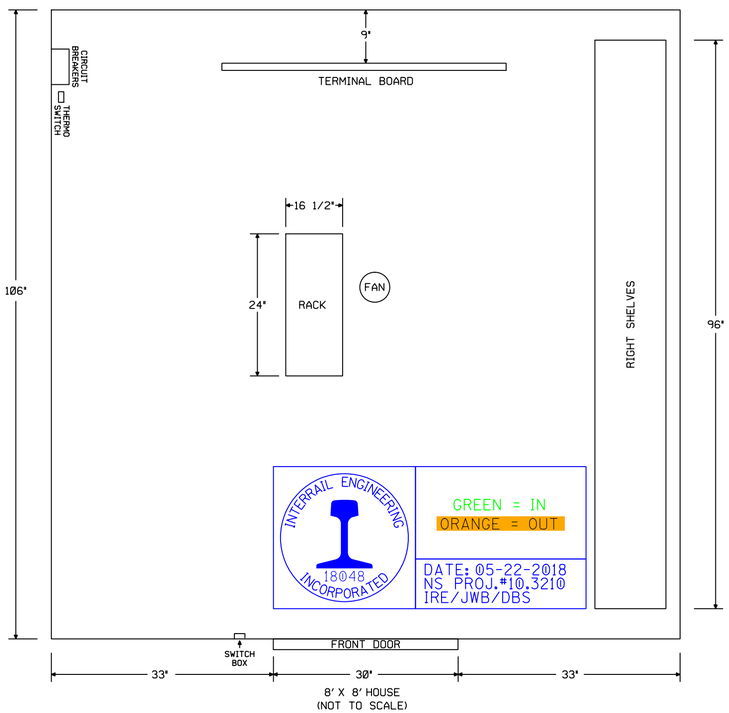
✱= POR RELAY P/N A62-407 Ø2-411542
POR RECTIFIER P/N A53-541 Ø2-390142

POR 1● 2● 3● 4● 5● 6● ✱	EOR A62 195 Ø2- 411526	XPR A62 262 Ø2- 411583	XGNR A62 205 Ø2- 411682	XGNPR A62 353 Ø2- 411609	1-2 GCPR A62 262 Ø2- 411583	BPR A62 262 Ø2- 411583	XGMR A62 406 Ø2- 395489
W BPPR A62 262 Ø2- 411583	E BPPR A62 262 Ø2- 411583	NWA-1W DAXR A62 262 Ø2- 411583	NWA-2W DAXR A62 262 Ø2- 411583	KEY-1W DAXR A62 262 Ø2- 411583	KEY-2W DAXR A62 262 Ø2- 411583	U2E DAXPR A62 262 Ø2- 411583	U1E DAXPR A62 262 Ø2- 411583
WV2W DAXR A62 262 Ø2- 411583	WV1W DAXR A62 262 Ø2- 411583	2E HR A62 262 Ø2- 411583	2E NWLPR A62 262 Ø2- 411583	3-4 GCPR A62 262 Ø2- 411583			

RELAY ENERGY LOOPS

(REAR)





INTERRAIL ENGINEERING INCORPORATED 18048

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10,3210
IRE/JWB/DBS

RELAY FUNCTIONS

POR
HD12- EBX
HD15- ENX
HD22- EBX
HD25- ENX
HD32- EBX
HD35- ENX

EOR
HD12- EX
HD15- EX
HD32- EX
HD35- EX

XPR
12-
15- XGN
22- XGM
25-
32-
35- B12 **1XX**
DRAFTING CORRECTION

XGNR
13-HD-EBX
15-HD-EBX
32-EO
35-XGNP

XGNPR
22-XGM
25-

BPR
12- WBPP
15- NWBPP
22- EBPP1
25- NEBPP1
32-
35-

XGMR
HD12- B12
HD15- N12 **B12**
HD22- B12
HD25- N12 **B12**
HD32-
HD35-

1-2 GCPR
12- XP
15-
22-
25-
32-
35-

KEY-2W DAXR
12- KEY-2WDAXP
15- NKEY-2WDAXP
22-
25-
32-
35-

KEY-1W DAXR
12- KEY-1WDAXP
15- NKEY-1WDAXP
22-
25-
32-
35-

U2E DAXPR
12- UAX2
15-
22-
25-
32-
35-

U1E DAXPR
12- UAX1
15-
22-
25-
32-
35-

2E NWLPR
12-
15- 2EAUX
22- 2EHP
25- N2EHP
32-
35-

2E HR
12- 2EHP
15- N2EHP
22-
25-
32-
35-

WV2W DAXR
12- WV2WDAP
15- NWV2WDAP
22-
25-
32-
35-

WV1W DAXR
12- WV1WDAP
15- NWV1WDAP
22-
25-
32-
35-

NWA-2W DAXR
12- NWA-2WDAXP
15- NNWA-2WDAXP
22-
25-
32-
35-

NWA-1W DAXR
12- NWA-1WDAXP
15- NNWA-1WDAXP
22-
25-
32-
35-

3-4 GCPR
12- XP
15-
22-
25-
32-
35-

W BPPR
12-
15- 2WUAX
22-
25- 1WUAX
32-
35-

E BPPR
12-
15- 2EAUX
22-
25- 1EAUX
32- POR
35- NPOR

FIELD VERIFY POR CONTACTS INSTALLED AND MARK LOCATION FOR A.I.S.

PER EXISTING PLANS IN FIELD
CHANGES WHERE MADE TO CIRCUITS
CHANGES WHERE NOT SHOWN
FIELD VERIFY CIRCUITS
AND MARK CHANGES FOR A.I.S.

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

MATERIAL REF.# Ø2-247664

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
LOCATION PLAN

ISSUE DATE: APRIL 3, 1998		2412-0677
DES DRN CHK APP	REV. 43	09-04-13	SHEET 1411

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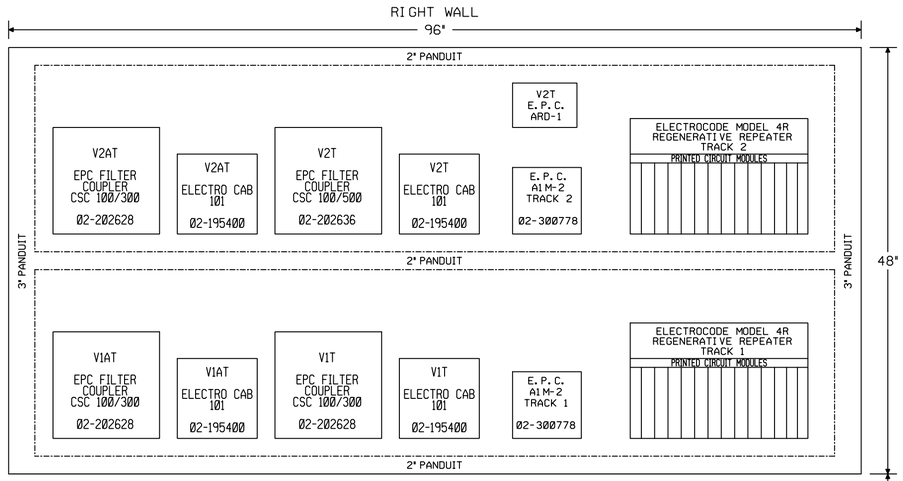
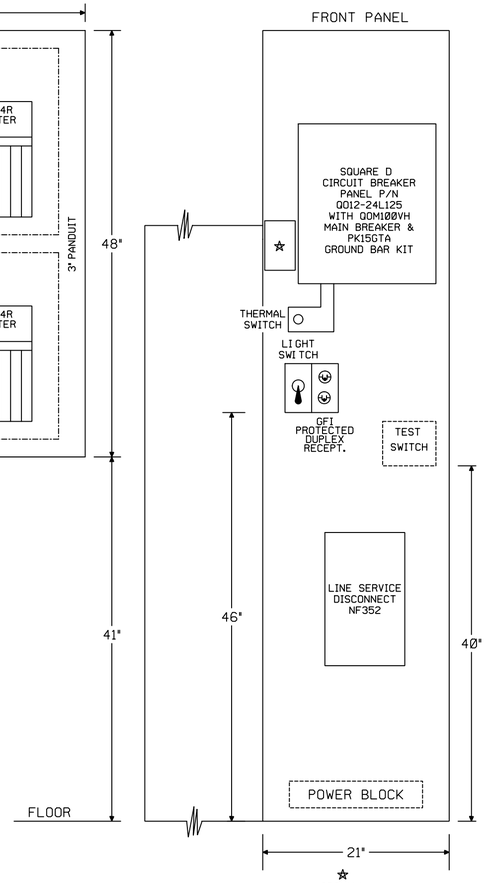
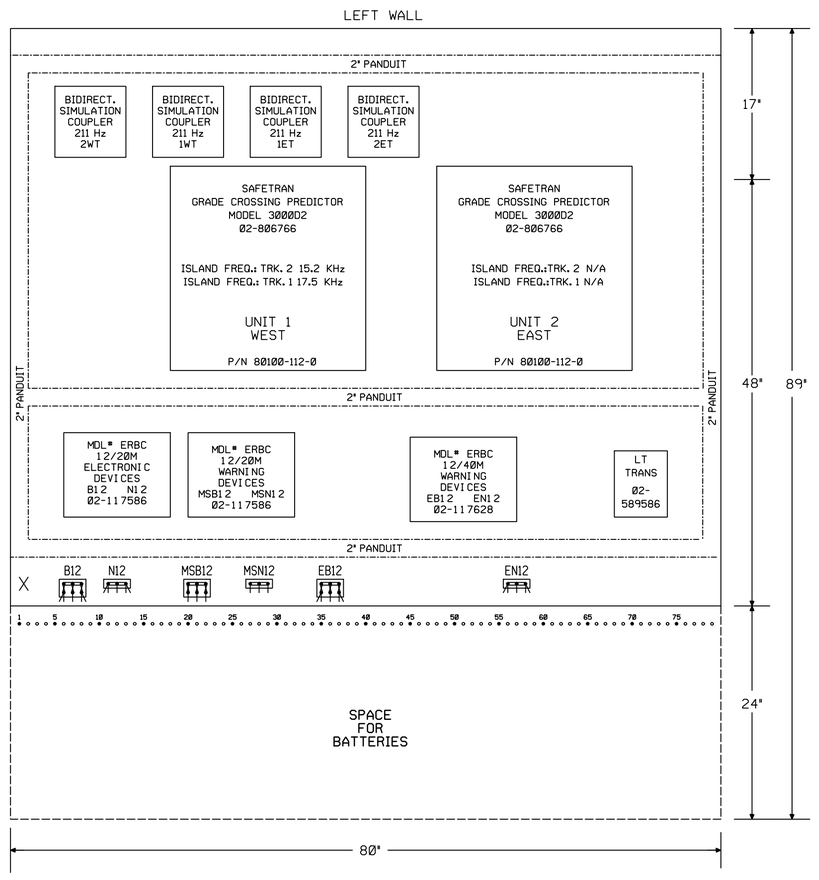
24120677.11

C&S CAD

WALLS VIEW FROM (INSIDE) REAR OF APPARATUS ENCLOSURE







PER EXISTING PLANS IN FIELD CHANGES WHERE MADE TO CIRCUITS CHANGES WHERE NOT SHOWN FIELD VERIFY CIRCUITS AND MARK CHANGES FOR A.I.S.

INTERRAIL ENGINEERING 18048 INCORPORATED

GREEN = IN
ORANGE = OUT

DATE: 05-22-2018
NS PROJ.#10,3210
IRE/JWB/DBS

RED = IN
YELLOW = OUT

DATE: 10-20-2015
NS PROJ.#
NS/WDM

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
WALL LAYOUT

ISSUE DATE: APRIL 3, 1998		2412-0677
AS NEW REV. 43	09-04-13	SHEET 1512

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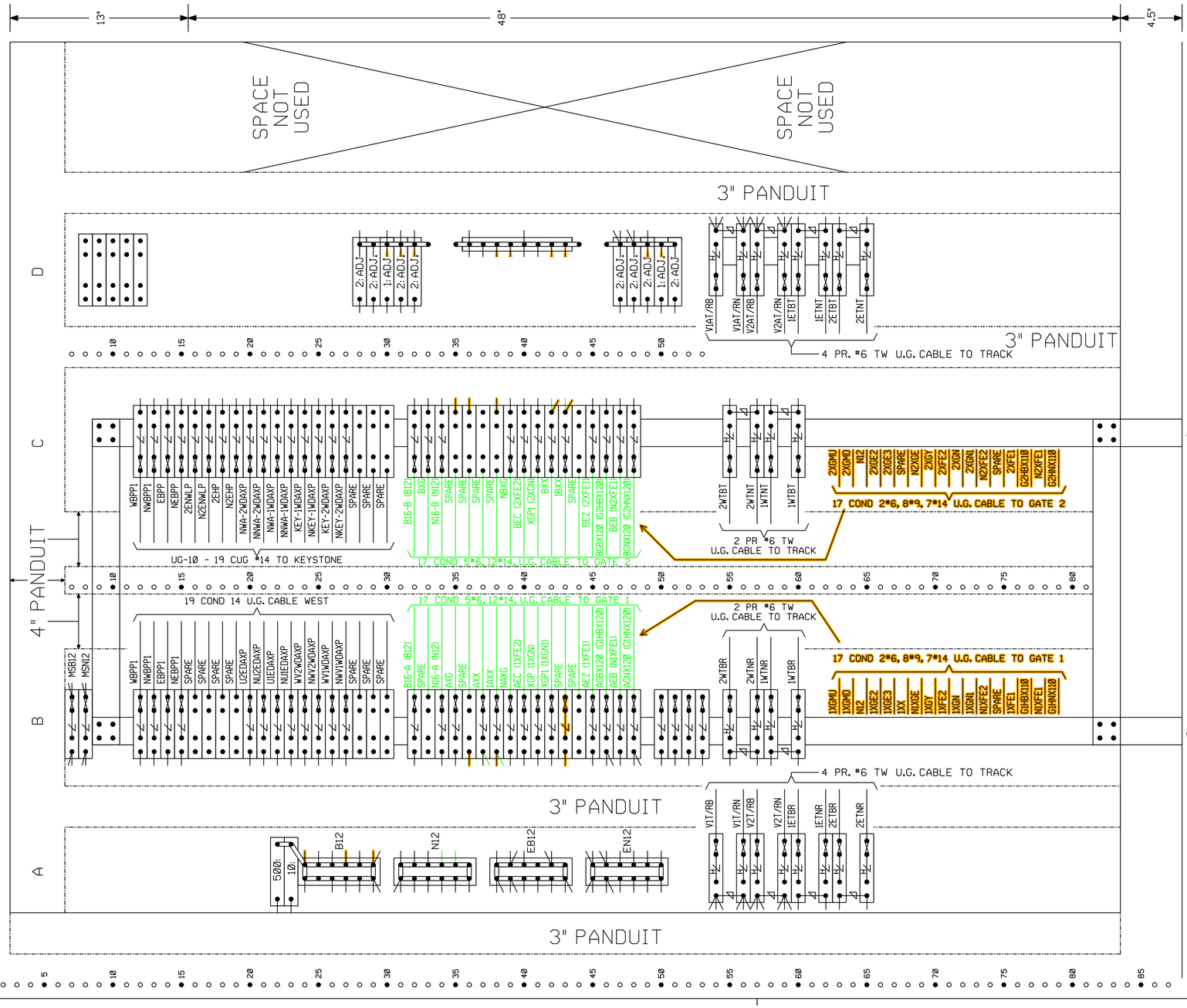


NOTES:

1: FIXED	02-423547 - RESISTOR
1: ADJ.	02-425799 - RESISTOR
2: ADJ.	02-425807 - RESISTOR
5: ADJ.	02-422754 - RESISTOR
10: FIXED	SAFETRAN 029245-3X - RESISTOR
22: FIXED	02-425849 - RESISTOR
100: FIXED	02-423646 - RESISTOR
500: FIXED	02-423711 - RESISTOR
	02-036133- 4 POST PORCELAIN BASE
	02-037057 - 3 POST PORCELAIN BASE
	02-050753 - TERMINAL BLOCK FOR EQUALIZER
	02-048757 - TERMIMAL STRIP
	02-150009 - BUSS LINK
	02-286662 - TEST LINK ASSEMBLY
	02-025920 - ARRESTER, HEAVY DUTY, WITH BASE
	02-026613 - ARRESTER, HEAVY DUTY, WITHOUT BASE
	02-025565 - ARRESTER
	02-197950 - EQUALIZER

GROUND BUSS WELDED TO FLOOR — GROUND CONNECTION TO BE IN ACCORDANCE WITH STANDARD PLAN CS-9001-A

NORFOLK SOUTHERN

UNION AVENUE / REPEATER 67.7 — ALLIANCE, OHIO

HIGHWAY CROSSING - REPEATER
TERMINAL BOARD ARRANGEMENT

ISSUE DATE: APRIL 3, 1998		2412-0677
REV. 54	09-04-13	SHEET 1613

24120677.16
24120677.13

OHIO RAIL DEVELOPMENT COMMISSION

Mail Stop #3140, 1980 West Broad Street, Columbus OH 43223

John R. Kasich, Governor • Mark Policinski, ORDC Chairman

February 22, 2018

Mr. Stephen J. Klinger
Norfolk Southern
Administrator Grade Crossing Program
1200 Peachtree Street NE, Box 123
Atlanta, Ga. 30324

RE: Stark County-SR225/Union Ave. DOT# 503-013S,
PID# 106855. Warning Device Improvements

Dear Mr. Klinger:

A diagnostic review was held at the above grade crossing on August 11, 2017. The crossing has been recommended for L.E.D and equipment upgrades. Norfolk Southern (NS) is authorized to proceed with the site plans and cost estimates (PE) or bid package for this project. This authorization is made with the stipulation and understanding that any field work needs prior approval before work begins. This authorization is made with the stipulation and understanding that an approved estimate may contain entries for items or activities that may be cited and found to be ineligible for federal participation during the project audit.

The diagnostic review form is attached. Please note any recommendations (page 1), if any, made by the team with regard to requirements for this location. Any minor roadway work necessary for MUTCD compliance should be incorporated into the PE and such costs will flow through the railroad reimbursement process.

The Project Manager for this project is James Tucker. James can be reached at (614) 398-6897, or james.tucker@dot.ohio.gov, if you have any questions.

Sincerely,

Project Manager

C: Randall Schumacher, Supervisor, Rail Division, PUCO
Jill Henry, Grade Crossing Planner, PUCO
Susan Arduini, ORDC
ORDC (file)

Attachment: 1 (diagnostic review form)

OHIO RAIL DEVELOPMENT COMMISSION

Ohio Rail Development Commission
Mail Stop 3140, 1980 W. Broad Street,
Columbus, OH

High Hazard Crossing With Active Warning Devices			
Street Name: SR 225-0.19 Union		County: STA	
LHA: City of Alliance		USDOT#: 503013S	
Nearest City: Salem		Hazard Rank: 3	
Roadway Information			
ADT: 10900 (2006)	Posted Speed Limit:		
Railroad: Norfolk Southern	Number of Tracks: 2		
Train Count: ~~26~~ 62-65	Speed Over Crossing: 40		
Storage Distance (Ft.): Not Listed	Train Detection Type: CD/AFO GCP- 3000 Predictor		
Accidents			
Accident Factors	4 # of Accidents in Last 5 Years:		
	0 # of Fatalities in Last 5 Years:		
Accident Date	2/27/17	1/17/17	11/12/15
Position of Accident	Stalled on crossing	Stalled on crossing	Stalled on crossing
Circumstance			
Visibility/Time of Day	Dark	Dawn	Dark
Weather Conditions	Clear	Rain	Rain
Crossing Interconnect.	Yes	Yes	Yes
Crossing Illuminated	Yes	Yes	Yes
Drove Around Train			
Highway User Action	Stopped on crossing	Stopped on crossing	Stopped on crossing
Alcohol/Drug Related?			
Driver Speeding?			

Other Notes: 2/27/17: NS train struck a hwy user. 1/17/17: NS train struck a hwy user. 11/12/15: NS train struck a hwy user.

Recommendations: full LED upgrade to both Quads. Also replace the existing gate Mech's with new. There will ~~could~~ be sidewalk work included contingent upon the Norfolk Southern design.

Curtis Byrd

J. T. WDMc CMS

City would like to be sure that the sidelights for Perry Street are aimed correctly.

County: STA **Route:** SR 225-0.19, Union Ave. **DOT#:** 503013S **Date:** 8/11/2017

Existing Traffic Control Devices

Type of Warning Devices	Installed?		Quantity/Comments
Advance Warning Signs (condition?)	(Yes)	No	
'Stop' Signs	Yes	(No)	At crossing no, but SR 183 has one along with Perry St.
'Stop Ahead' Signs	Yes	(No)	
Pavement Markings (condition?)	(Yes)	No	faded
Crossbucks	(Yes)	No	3
Number of Tracks Signs	(Yes)	No	
Inventory Tags	(Yes)	No	
Interconnected Highway Traffic Signal	Yes	(No)	
Mast-Mounted Flashing Lights	(Yes)	No	
Cantilever Flashing Lights	(Yes)	No	Number: Length:
Side Lights	(Yes)	No	
Automatic Gates	(Yes)	No	Number: 2 Length:
Bells	(Yes)	No	Number: 1
Sidewalk Gate Arms	Yes	(No)	
'No Turn' Signs	Yes	(No)	
Illumination	(Yes)	No	
Is crossing flagged by train crew?	Yes	(No)	
Other	Yes	No	

Railroad Data

Railroad Characteristics	Initial Information (from database)	Revised
Total trains per day	~~26~~	62-65
< 1 per day		
Day thru trains	~~9~~	31
Night thru trains	~~9~~	31
Daytime switching movements	~~4~~	0
Nighttime switching movements	~~4~~	0
Total number of tracks	2	
Number of main tracks	2	
Number of other tracks		
Maximum train speed	40	
Typical train speed	40	
Amtrak	40	

If multiple tracks, can two trains occupy crossing at the same time? (Yes) No

Can one train block the motorists' view of another train at crossing? (Yes) (Explain below) No

Can one or more tracks be eliminated through the crossing? Yes (No)

Are there other track(s) crossing this same roadway within 100 ft of this crossing? Yes (No)

If yes, Crossing DOT #(if different) _____

If yes, distance _____ (take measurement between track centerlines at closest point along roadway)

County: STA Route: SR 225-0.19, Union Ave. DOT#: 503013S Date: 8/11/2017

Roadway Data

Local Highway Authority: City of Alliance

Roadway Characteristics	Initial Information (from database)	Revised
Average daily traffic 10900	(2006)	
Highway paved	Yes X No	Yes No
Roadway Surface: (Blacktop) Gravel Concrete Other _____		
Roadway width: ___ft.		
Number of highway lanes	2	
Urban or Rural	Urban	
Vehicle Speed: ___ MPH	25 mph	

School Bus Operation: **No** **Yes** Amount _____ LHA will set the #

Hazardous Materials Trucks: **No** **X Yes** Amount _____.06%_____

Shoulders: (**No**) **Yes** Curbed

Is the shoulder surfaced? (**No**) **Yes**

Is there existing guardrail along roadway in crossing vicinity? (**No**) **Yes**

Is stopping site distance adequate? (See Table 2) (**Yes**) **No** If no, deficient approach(es) _____

Quadrant _____ Curb and Gutter:	Quadrant _____ Curb and Gutter:
(Functional (Curb height = 4" or more))	(Functional (Curb height = 4" or more))
Non-functional (Curb height = Less than 4")	Non-functional (Curb height = Less than 4")
None	None

Pedestrians: **No** (**Yes**)

Is sidewalk present? **No** (**Yes**)

Is there a nearby intersection that could cause queuing over the crossing? (**No**) **Yes**

If yes,

Street Name _____

Distance _____

Is this intersection signalized? (**No**) **Yes**

Are the signals currently interconnected with the existing crossing warning devices? (**No**) **Yes**

Is there a 'Do not Stop on Track' sign? (**No**) **Yes**

Is a roadway improvement project (e.g. widening, turn lanes, nearby new or upgraded traffic signal, sidewalk) planned at or near this location in the foreseeable future? **No** (**Yes**)

If yes,

Improvement type mill + fill Lead Agency LHA = Alliance

Timeline/completion 2020

Is it the consensus of the Diagnostic Review Team that this is a potential closure project? (**No**) **Yes**

Explain reasons:

Type of Development

Open Space Institutional

Industrial (Commercial)

(Residential)

Location of nearby schools:

3 miles South

County: STA **Route:** SR 225-0.19, Union Ave. **DOT#:** 503013S **Date:** 8/11/2017

Potential Red Flags / Project Challenges

Traffic Signal Preemption (include traffic signal intersection name and LHA with jurisdiction over traffic signal, if known):

N/A

Crossing Consolidation or Closure:

N/A

Real Estate or ROW:

N/A

Culverts / Drainage / Ballast Conditions:

N/A

Roadway and/or Sidewalks:

Existing gate mech in SE Quad is located in the sidewalk

Circuitry (e.g. reaches out to other crossings, specific needs, etc.):

N/A

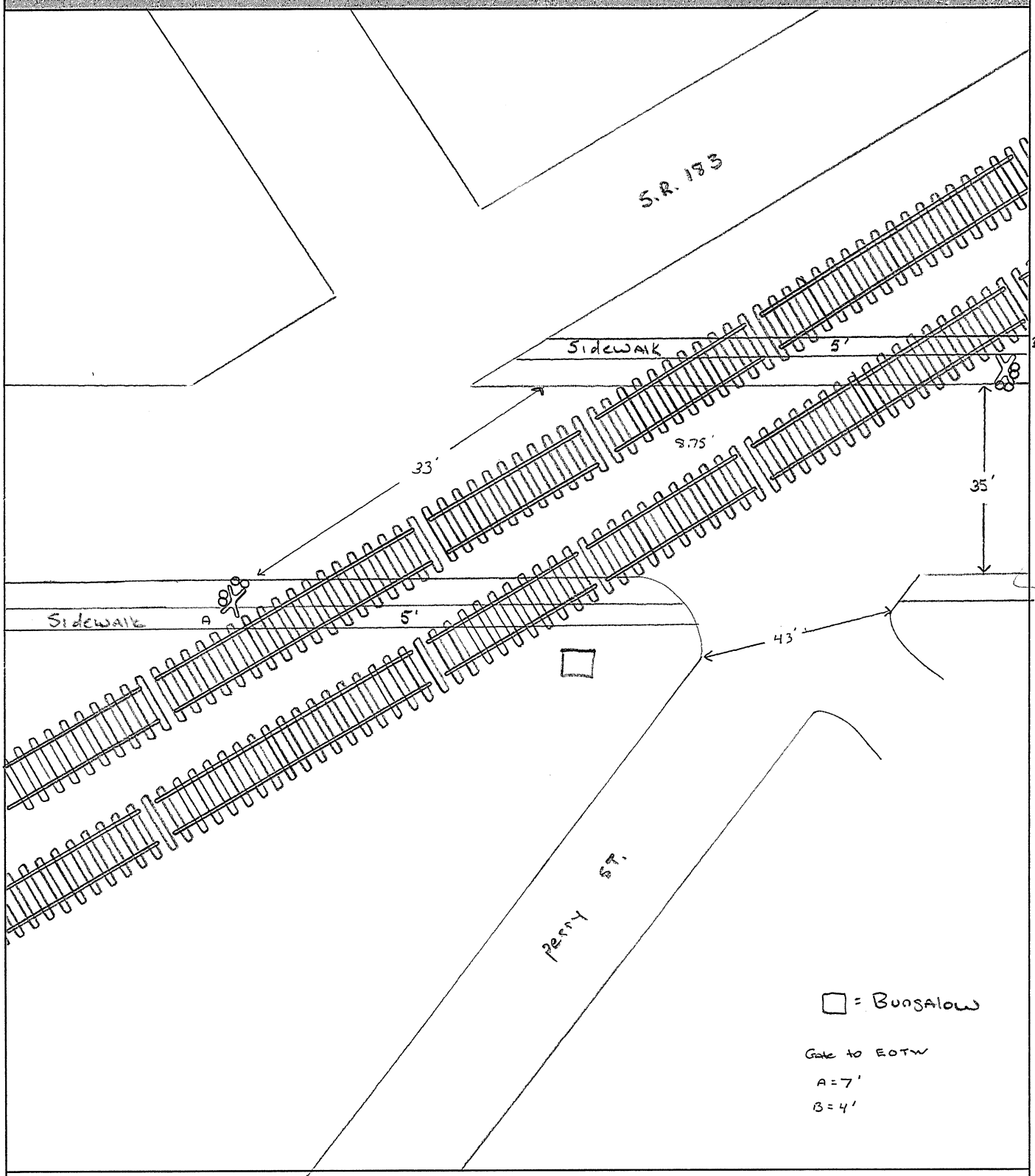
Environmental:

N/A

Other:

503013S

Field Sketch



Crossing Angle ☐ 0-29° ☐ 30-59° ☐ 60-90° Measured in _____ Quadrant?

Sketch by: _____

County: STA Route: SR 225-0.19, Union Ave. DOT#: 503013S Date: 8/11/2017

TABLE 1

Clearing Sight Distances

Maximum Authorized Train Speed	Distance (dT) Along Railroad from Crossing (ft)
1 - 10	240
15	360
20	480
25	600
30	720
35	840
40	960
45	1080
50	1200
55	1320
60	1440
65	1560
70	1680
75	1800
80	1920
85	2040
90	2160

Source: R-H Grade Crossing Handbook Table 36 (pp. 132-133)

Notes:

All calculated distances are rounded up to the next higher 5-foot increment.

Distances indicated are for 65-ft double bottom semi-tractor trailers and level single track 90 degree crossings; and may need to be adjusted for multiple tracks, skewed crossings or approaches on grades.

Clearing Sight Distance is to be measured in each vehicle travel direction at non-gated crossings as viewed from a point 25 feet from centerline of nearest track in the center of whichever travel lane is nearest the direction along track being measured.

TABLE 2

Stopping Sight Distances

Highway Vehicle Speed	Distance (dH) Along Roadway from Crossing (ft)
0	n/a
5	50
10	70
15	105
20	135
25	180
30	225
35	280
40	340
45	410
50	490
55	570
60	660
65	760
70	865

Source: R-H Grade Crossing Handbook Table 36 (pp. 132-133)

Notes:

All calculated distances are rounded up to the next higher 5-foot increment.

Distances indicated are for 65-ft double bottom semi-tractor trailers on dry level pavements.

Stopping Sight Distance is to be measured on each roadway approach to crossing from stop bar.

OHIO RAIL DEVELOPMENT COMMISSION

Ohio Rail Development Commission
Mail Stop 3140, 1980 W. Broad Street,
Columbus, OH

Diagnostic Review

(COL – CR 444A, S. Lincoln Ave. DOT # 502876E)

8/11/2017

Please print:

NAME	AGENCY	EMAIL ADDRESS	PHONE
James Tucker	ORDC	James.tucker@dot.ohio.gov	614-398-6897
Randy Johr	PUCO	Randy.Johr@dot.ohio.gov	330-495-3810
Shawn McCauley	NS - MAINTAINER	Shawn.McCauley@nscorp.com	330 831 2198
Wayne McCauley	CMS Supv NS	Wayne.McCauley@nscorp.com	330-204-9041
Curt Bungard	Alliance	bungardcd@allianceoh.gov	330-823-5122
Cathy Stout	ORDC	Catherine.stout@dot.ohio.gov	614 644 0313
Tim Brown	ORDC	Timothy.brown@dot.ohio.gov	614-728-5426

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

10/29/2018 3:37:06 PM

in

Case No(s). 18-1616-RR-FED

Summary: Application In the Matter of a Request for Upgrades to the Active Warning Devices at the Norfolk Southern Railway Crossing, Union Avenue DOT#503-013S, in Stark County, Ohio. electronically filed by Mrs. Jill A Henry on behalf of PUCO/Rail Division