

North Carolina Department of Transportation
Traffic Signal – Railroad Grade Crossing Interconnection and Preemption
Inspection Form

Date of Inspection: _____ Inspected By: _____

Signal Inventory No.: _____ DOT Crossing No.: _____

Railroad Co: _____ RR Representative: _____

Date of Last Inspection _____ RR Rep. Phone: (____) _____

Division: _____ County: _____ City or Town: In / Near _____

Traffic Controller (Manuf/Model) _____ Traffic Cabinet (Manuf/Model) _____

Intersection Location

Route Number: _____ Name: _____

at

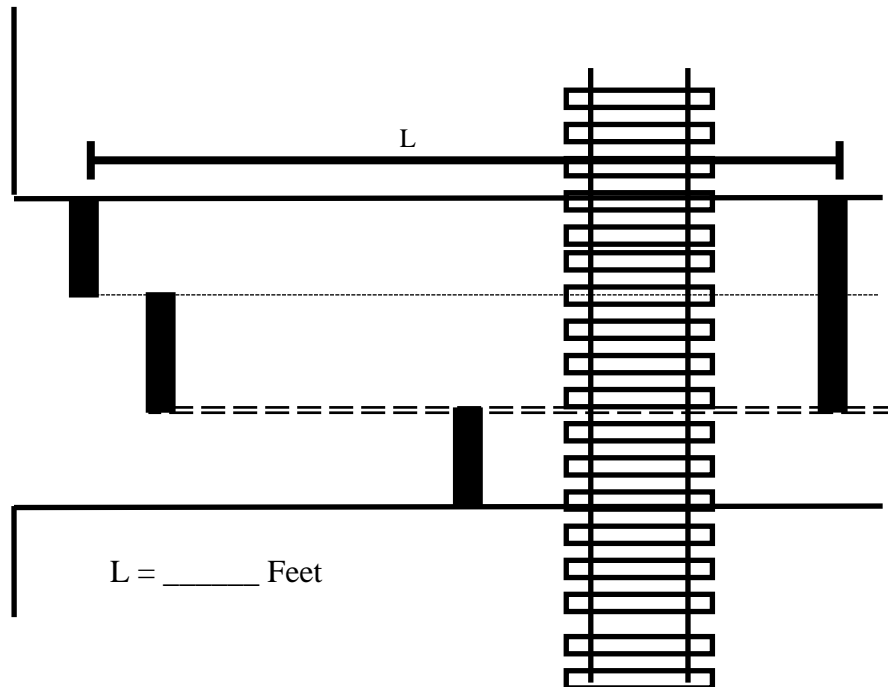
Route Number: _____ Name: _____

Railroad Milepost _____



1. Calculate track clearance green by current standard (Greenshield's formula).

Distance To Measure In Order To Calculate Track Clear Green Time



If an approach has multiple stopbars, measure the distance from the stopbar behind the track to the farthest stopbar (closest to intersection).

Measure from stopbar behind track to stopbar at intersection. If calculation is less than 10 sec., use 10 sec. minimum.

- a.) Insert distance L into formula below:
 $2 \text{ sec.} \times L/20$ (L = distance divided by 20 feet per car)
 + _____ 4 sec. (Start-up delay)
 _____ Seconds = Greenshield's Formula Calc. for **TRACK CLEARANCE GREEN**.
- b.) If **SIMULTANEOUS PREEMPTION** is used, record the calculated value shown in item **1a)** (above) in the **TRACK CLEARANCE GREEN** section in the chart under item 2 (below) and **skip items 1c) and 1d).**
- c.) If **ADVANCE PREEMPTION** is used, the **RIGHT OF WAY TRANSFER TIME** must be calculated and **added** to the Greenshield's calculation to determine the total amount of **TRACK CLEARANCE GREEN** time (see item **1d)** below):
- d.) If **ADVANCE PREEMPTION** is used, calculate **RIGHT OF WAY TRANSFER TIME**:

_____ Min Green Before Preempt
 + _____ Ped Clear Before Preempt
 + _____ Yellow Clear Before Preempt
 + _____ Red Clear Before Preempt

Amount of **RIGHT OF WAY TRANSFER TIME** = _____ Seconds

GREENSHIELD'S Formula Green [From **1a)**] + _____ Seconds

Total Amount of **TRACK CLEAR GREEN TIME** = Seconds (Record this time in chart below in item 2 beside **TRACK CLEARANCE GREEN**).

- e.) Is the calculated **TRACK CLEARANCE GREEN** time above for the type of preemption used at this crossing (advance or simultaneous), consistent with what is shown on the signal plans and/or programmed in the field? **Yes No**

2. Calculate the **PREEMPTION TIME REQUIRED**:

Function	Seconds
Delay Time	
Ped Clear Before Preempt*	
Min Green Before Preempt	
Yellow Clear Before Preempt	
Red Clear Before Preempt	
Track Clearance Green	
Track Clearance Yellow	
Track Clearance Red	
Preemption Time Required	

**Note: PED CLEAR BEFORE PREEMPT should be timed concurrently with YELLOW CLEAR BEFORE PREEMPT. Enter only the exclusive amount of PED CLEAR time that is not displayed concurrently with the YELLOW CLEAR (ex. 5 sec. Ped Clear – 4.5 sec. Yel. Clear = .5 sec.).*

—Enter the above **PREEMPTION TIME REQUIRED** in **Item 14a)** of this form—

3. OBSERVE OPERATION of the traffic signal (including control equipment in the cabinet and field equipment) for proper programming & operation. Is equipment operating properly and does the operation coincide with the signal plans? **Yes No**

a) Are signs shown on signal plan installed properly? **Yes No**

4. If intersection has MULTIPLE PREEMPTS in use, verify that the RAILROAD PREEMPT is set as the **HIGHEST PRIORITY**. **N/A Pass Fail**

5. If crossing has multiple through line tracks — perform **SECOND TRAIN SEQUENCE** test (preempt re-service). **N/A Pass Fail**

a) Does **preempt call release** immediately when gates **begin** to rise? **Pass Fail**

6. Identify the general type of railroad signal equipment with its particular reaction time:

Circle type: PREDICTOR MOTION AC/DC AFO

Manuf.: _____ Model: _____ Reaction time: _____ Seconds

Note: Reaction time will be used in RR WARNING TIME formula (item 9). If reaction time cannot be obtained, use 5 seconds as worst case.

7. Obtain the **TRACK CIRCUIT APPROACH LENGTHS** for each direction from the railroad signal maintainer / inspector as shown on their PLAN OF RECORD or inspection documentation in the railroad signal cabinet:

Northbound/Eastbound approach: _____ Southbound/Westbound approach: _____

Indicate to what point approach length is measured from starter/shunt, as each railroad may reference differently (circle):

ISLAND EDGE OF CROSSING SURFACE EDGELINE OF TRAVEL CENTER OF CROSSING

8. Obtain **MAXIMUM TRAIN SPEED** for the crossing from railroad signal maintainer / inspector (using *Timetable Speed or Railroad Permanent Speed Restriction*):

Railroad Northbound / Eastbound approach: _____ MPH

Railroad Southbound / Westbound approach: _____ MPH

9. Calculate amount of **RR WARNING TIME** provided by track circuitry as calculated using the formula below (use space provided at bottom of page to aid in calculation):

(Shortest Approach Length in Feet) (Minus) Equipment Reaction Time = **RR Warning Time**
 (1.47) (Train Speed in MPH)

minus = Seconds [Carry to item 14c]
 (1.47)

10. Is crossing signal equipped with **ADVANCE PREEMPTION**? **Yes** **No**

*Note: If **ADVANCE PREEMPTION** is used, a train movement must be observed. Care must be taken to answer items 11, 11a, and 11b) below. If **SIMULTANEOUS PREEMPTION** is used, a train movement observation is not required; however, if train movement occurs during inspection, enter actual observed warning time (taken with stopwatch) in **item 11**.*

11. Observed total warning time of **ACTUAL TRAIN MOVEMENT**: N/A _____ Seconds

a) Does controller/cabinet **RESPOND TO PREEMPT CALL** properly? **Pass** **Fail**

b) During train movement, does signal remain in **TRACK CLEARANCE GREEN** at least until entrance gate is fully horizontal? **Pass** **Fail**

12. If no train movement is expected, have the railroad signal maintainer/inspector activate the crossing with a shunt placed across the rails in the island circuit (*This item may be omitted if train movement is observed*).
 Observe traffic **signal preemption & crossing** operation. N/A **Pass** **Fail**

13. If Railroad crossing signal equipment is designed for **CONSTANT WARNING TIME** (i.e. predictor) and/or is equipped with **ADVANCE PREEMPTION** obtain the following values from the railroad signal maintainer / inspector:

a) How much **RR WARNING TIME** is programmed in the unit? _____ Seconds

b) If railroad provides **ADVANCE PREEMPTION**, how many seconds of additional **DAX TIME** is programmed (DAX time minus warning time). _____ Seconds

14. Compare **PREEMPTION TIME REQUIRED** with **RR WARNING TIME**:

a) **PREEMPTION TIME REQUIRED (from Item 2)**: _____ Seconds

b) Total **RR WARNING TIME** programmed on railroad predictor (if used). **Total from Item 13a) + 13b)**: _____ Seconds

c) Total Warning Time avail. from **TRACK CIRCUITRY (From Item 9)** _____ Seconds

CONCLUSION

• Is **14c)** GREATER THAN OR EQUAL TO **14b)**? **Yes** **No**

• Is **14a)** LESS THAN OR EQUAL TO **14b)** and **14c)**? **Yes** **No**

*If the answer to either of the above questions is **NO**, contact the Signal Design Section (Regional Signal Engineer) immediately at (919) 814-5000.*

Send a copy of this **INSPECTION FORM** with **ATTACHED COMMENTS** (if necessary) and any marked-up plans to:

Mail: NCDOT – Rail Division
 Engineering Coordination and Safety Branch
 ATTN: Inventory & Data Analysis Manager
 1556 Mail Service Center
 Raleigh, NC 27699-1556

Office/Delivery: 862 Capital Boulevard
 Raleigh, NC 27603