INSTRUCTIONS

for the

Texas Department of Transportation
TRAFFIC SIGNAL PREEMPTION INSPECTION FORM

USING THESE INSTRUCTIONS:

The purpose of these instructions are to assist TxDOT personnel in completing the *2022 TxDOT Traffic Signal Preemption Inspection Form 2625*, also known as the Preemption Inspection Form. The main purpose of the Preemption Inspection Form is to formalize preemption inspection and testing across the state.

If you have any questions about completing the Preemption Inspection Form, please email them to TRF_Preemption_Inspection@txdot.gov.

After approval by the District, a copy of the Preemption Inspection Form, along with the traffic signal design sheets and the phasing diagrams for normal and preempted operation, shall be placed in the traffic signal cabinet and emailed to TRF_Preemption_Inspection@txdot.gov.

Note that the Preemption Inspection Form may not suffice in all types of road/rail geometries. For example, a separate inspection is required in situation where two railroads have separate preemption interconnections with an intersection, or the crossing has two traffic signals interconnection circuits.

SECTION 1 – GENERAL INFORMATION:

Reason for Inspection:

a. New Location: An inspection initiated due to the installation of a new interconnected traffic signal or at the request of the Railroad for the installation of newly designed or upgraded railroad equipment.
b. Annual Inspection: A comprehensive joint inspection by the highway authority and railroad as recommended in the FRA Safety Advisory 2010-02.
c. System Changes: An inspection initiated due to either the traffic signal or the railroad warning system requiring changes that may affect the timing of the existing preemption operations.
d. After Incident: An inspection initiated due to crash, severe weather, equipment replacements, etc. that has or may have damaged the integrity of the preemption operation and requires testing to confirm that the system is operating per the design.
e. Other: An inspection initiated at the request of the highway authority, railroad, or any other regulatory agency for reasons not listed above.

Safety Briefing:
Ensure all parties involved in the preemption inspection are involved in an on-site safety briefing before any work begins. If personnel arrive at a later time, ensure they are briefed before they begin work. The railroad should be given a chance to speak about safely working on or near the track.

List of Attendees:
A list of attendees sign-in sheet is provided on page 4 of this form. The form should be completed by all attendees prior to the start of the inspection. This is typically done as part of the safety briefing.

Original Design Data Available?
Yes: This will expedite testing by ensuring that the traffic signal controller is programmed per the timing data, and that the geometry of the intersection has not changed since the original design. Data may include all or some of the following: traffic signal design plans, preempt calculation form, railroad preempt request form, and traffic signal timing.
No: It is encouraged that all avenues of discovery are taken ahead of the scheduled inspection to find the original design data, but this will not always sufficient to locate the data for intersections that have been in-service for years. At an inspection where the design data is unavailable, extra scrutiny should be taken to ensure traffic signal programming is appropriate for the preemption operation. The inspector should also take records of all timing data from the traffic controller and copies of any traffic signal design documents that could be with the traffic signal cabinet. Attach these records to the inspection document.

Enter the **Date of Inspection**, **Time**, and **Inspector Certification ID** of the personnel who performed the inspection followed by the **TxDOT District**, **TxDOT Traffic Signal ID#**, **Traffic Signal Owner**, and **Traffic Signal Maintained by**. When entering the District name, do not use the dated district numbering schema; use the actual district name.

Next, enter the **Operating Railroad** name, do **Commuter or Amtrak** trains utilize the tracks/crossing, the unique 7-character Crossing **DOT#** (department of transportation number consisting of 6 numeric plus one alphanumeric characters), **Railroad Subdivision**, and **Railroad Milepost**. This information may be found on the FRA inventory FORM which is available on the FRA website at https://railroads.dot.gov/safety-data/crossing-and-inventory-data/crossing-inventory-lookup. The DOT number and railroad milepost is typically printed on the outside the railroad signal house.

Next, **Other DOT# assigned on adjacent track:** Some locations may have a different DOT number assigned to the adjacent track if owned and operated by a different railroad. If so, provide that DOT number or numbers as applicable. If there is not another DOT number, the **N/A** checkbox is to be marked.

Next, record the name of the **Crossing Street Name** and the **Parallel Street Name** in the spaces provided, and remember to include any street sign/local name for the streets as well as any state/US/Interstate designation (i.e., “FM 1826,” “SH 71,” “US 290,” “IH 35 [frontage]”). Then, enter the location for the preempted intersection adjacent to the highway-rail grade crossing including the (nearest) **City**, the **State**, and the **County** in which it is located.

Next, answer the question; “**Any roadway geometry changes since last inspection?**” If this is answered with a **Yes**, or any questions arise as to if a change constitutes a “roadway geometry change”, inspection personnel are to Contact TXDOT Austin TRF/District Railroad Coordinator/Railroad to review the changes for impact on existing preemption design calculations. *If needed use the “Appendix – Intersection Sketch Area” to illustrate geometry changes.*

Next, record the **Posted Roadway Speed** for the roadway that crosses the railroad track(s).

Next, answer the question; “**ENS phone number posted at railroad crossing?”** This should be located on the blue Emergency Notification Signs (ENS) (I-13) generally mounted upon the railroad warning device masts. Other locations to find the ENS phone number could be the posted signage on the railroad signal house or in the FRA inventory FORM which is available on the FRA website at https://railroads.dot.gov/safety-data/crossing-and-inventory-data/crossing-inventory-lookup. If the answer is **No**, contact the operating railroad to correct the deficiency. Then **Call the ENS phone number to confirm Railroad Dispatching and identify crossing location** and check the box. Lastly, include any **Remarks** possible missing ENSs or other field observations.

SECTION 2 – TRAFFIC SIGNAL DATA:

Box 1. Select the **Traffic signal cabinet type** or select **Other** and manually fill in the option. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 1 for reference. Also, answer the question "**Changed since last inspection?**" pertaining to the traffic signal cabinet and if it had to be replaced since last inspection, if yes enter the previous traffic signal cabinet **type** or select **Other** and manually fill in the option. If there has never been a previous inspection the answer is **N/A**.

Box 2. Select the **Traffic signal controller Type**, **Manufacturer**, and **Model** or select **Other** in the respective category and manually fill in the option. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 2 for reference. Also, answer the question "**Changed since last inspection?**" pertaining to the traffic signal controller and if it had to be replaced since last inspection, if yes enter the previous traffic signal controller **Type**, **Manufacturer**, and **Model** or select **Other** and manually fill in the option. If there has never been a previous inspection the answer is **N/A**.

Box 3. Enter the **Traffic signal controller - Firmware** and **Version** installed. Also, answer the question "**Changed since last inspection?**" pertaining either the firmware or version and if it has been updated or replaced since last inspection, if yes enter the previous traffic signal controller – **Firmware** and **Version**. If there has never been a previous inspection the answer is **N/A**.

Box 4. Answer the question "**Traffic signal design plans in cabinet?**" and then proceed to either of the follow up actions; "**If yes, date on plans**" and record the date in the format MM/DD/YYYY or "**If no, follow up with Agency to locate plans**".

Box 5. Answer the question "**Traffic signal timing data in cabinet?**" and then proceed to either of the follow up actions; "**If yes, date on data**" and record the date in the format MM/DD/YYYY or "**If no, follow up with Agency to locate data**".

Box 6. Answer the question "**Preemption warning label signage present in cabinet?**" and then proceed to either of the follow up actions; "**If yes, verify information on label is correct**" by calling the phone number(s) listed on the label or "**If no, notify District Railroad Coordinator to install**". **Remarks** are for recording anything that has been corrected, addressed or if the warning label needs to be replaced.

Box 7. Answer the question "**Does traffic controller have existing backup power supply?**" and then proceed to either of the follow up actions; "**If yes, type**" and select **BBU** (battery backup), **Generator** (If a generator is permanently installed) or select **Other** and manually fill in the type.

Box 8. Select the **Interconnection method** by determining where the preemption cable from the railroad house to the traffic signal cabinet is terminated or select **Other** and manually fill in the method.

Box 9. Select the **Interconnection voltage** or select **Other** and manually fill in the voltage. Typically, this may be determined by reviewing the traffic signal design plans and railroad crossing plans. If the voltage is not shown on the plans test the connection with a voltage meter to determine voltage being used by measuring the voltage that energizes the preempt relay(s) or solid state input(s).

Box 10. Select the **Interconnection circuits** for the traffic signal system. The **Designed** circuits should be found on the traffic signal design plans and/or the preemption request form which should have been submitted to the railroad. If a circuit is not used mark **N/A**. Next, select the **Designed Configuration** for each of the circuits, again by reviewing the traffic signal design plans and/or preemption request form. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 10 for reference.

Then, determine which circuits are in-service between the railroad signal house and the traffic signal

cabinet and checking the boxes in the **Connected** column accordingly. The boxes are to be checked off even if a circuit is connected in a different configuration than is shown in the design, and if not used mark **N/A**. Next, select the **Connected Configuration** for each of the circuits, again by determining which circuits are connected between the railroad signal house and the traffic signal cabinet. These include the same selectable options as designed configuration. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 10 for reference.

The following are the possible **Designed/Connected** interconnection circuits include:
Advance (Vehicle) Preemption (AP or AVP) circuit provides an input to the traffic signal controller to initiate preemption operation a calculated amount of time before activation of the grade crossing warning devices. The time between when the preempt call is made to the traffic signal controller and when the warning devices become active is known as advance preemption time (APT). The AP or AVP circuit is used to terminate any active non-track clearance interval and transition to the programmed track clearance interval. In certain cases, the APT is split into two independent time periods, the first for advance pedestrian preemption (APP) operation and the second period for advance vehicle preemption (AVP) operation. When this occurs, two independent circuits are typically provided from the railroad. The first circuit is known as APP and the second circuit is known as AVP.

Advance Pedestrian Preemption (APP) circuit provides an input to the traffic signal controller to initiate preemption a calculated amount of time before activation of the advance vehicle preemption circuit and before activation of the grade crossing warning devices. The time between when the advance APP circuit is activated and when the AVP circuit is activated is known as the advance pedestrian preemption time (APPT). The APP circuit is used to terminate any active pedestrian WALK interval and begin the pedestrian change interval. Any non-active pedestrian movements are inhibited until after the traffic clearance interval.

Gate Down (GD) circuit allows the traffic signal controller to know when the automatic gates are within approximately five (5) degrees of horizontal. This will keep the traffic clearance interval from terminating prior to activation of the warning system and lowering of the automatic gates. The GD circuit plays a vital role in preventing a preempt trap, which may occur following the advance preemption operations due to warning time variabilities that ultimately result in drivers queued onto the tracks. Implementing a GD circuit not only improves grade crossing safety, it also removes the need for excessive track clearance interval and furthermore reduces delays for the non-conflicting directions of traffic. Without a GD circuit, the track clearance interval time can be significantly longer to account for varying conditions. This could result in the track clearance interval holding longer than expected after the gates are horizontal, frustrating drivers on all approaches to the traffic intersection.

Note, there could be a case that Pseudo Gate Down (PGD) circuit is used where the railroad crosses two approaches to an intersection. In this case, the preemption operation must provide a track clearance interval for each of the two approach roadways. The PGD circuit is used for the gate down indication for the first or the two track clearance intervals. PGD functions identical to the normal GD circuit with two exceptions:

- A timing circuit is used to provide a maximum period of time for the gate to descend. In the event the gate used in the PGD circuit is broken or does not indicate that the gate is down, the timing circuit limits the amount of time before activating the gate down indication. If the timing circuit was not implemented, a broken gate would result in the traffic signal controller remaining in the first track clearance interval and never advancing to the second track clearance interval prior to the arrival of the train at the crossing.
- The island wrap circuit is not used in a PGD circuit. The presence of the timing circuit negates the need for the island wrap circuit.

The timing circuit may be provided in the warning system or the traffic signal controller. In some cases, PGD exists solely as a timing circuit in the traffic signal controller without using an actual gate down indication. The appropriate application of a PGD circuit needs to be based on site-specific requirements.

Crossing Active circuit, commonly referred to as the “XR” or “XC” circuit, will notify the traffic signal controller at the start of the railroad active warning system operation. The crossing active circuit is used to initiate preemption where simultaneous preemption is used. In advance preemption operation, the crossing active circuit is used to address conditions where the railroad, by nature of its operations, provides less than the calculated preemption time. Various train moves in the vicinity of the crossing may require a different preemption plan in the traffic signal controller that demands a truncated or eliminated minimum green, walk and/or pedestrian clearance time where the preemption time is shortened. The crossing active circuit can be beneficial in accommodating a train restart move or second train event if the crossing has more than one track. For example, if an approaching train stops before reaching the crossing where motion sensing circuits are in place and the train has remained stopped for approximately 20 seconds, the active warning system will recover as long as the train stops short of the crossing (island circuit). When this occurs, the gates will ascend, and the preemption call ceases in the traffic signal controller. Once the train resumes movement towards the crossing, the APT can be reduced or even eliminated since the train has already entered the approach and the warning devices will reactivate. In this situation, the traffic signal should attempt to reach the track clearance interval in a safe but also prompt manner. Under these circumstances, the railroad operating rules regulate train movements through the crossing which commonly involves the train crew procedure of guaranteeing that the crossing is clear of vehicles and the gates are fully descended before proceeding over the crossing. The crossing active circuit is also commonly used to active blank-out signs used to restrict turns toward the grade crossing.

Traffic Signal Health (TSH) circuit notifies the railroad equipment of a failure in the traffic signal control equipment. This is a 12 Vdc circuit which is normally energized and fused for 500 mA. In the event the traffic signal enters a flashing state, or the signals are dark (commercial power failure, signals off manually, backup battery system depleted, etc.), this will de-energize the TSH circuit.

The **Designed/Connected Configuration** options include:

No supervision, single break typical design uses one of the two conductors in an electrical circuit configured as open or closed to activate or deactivate a circuit.

No supervision, double break typical design has both conductors configured as open or closed to activate or deactivate a circuit.

Supervision, single break typical design uses one of the two conductors in an electrical circuit configured as open or closed to activate or deactivate a circuit with an additional circuit added that is wired out of correspondence with the main circuit providing a fault indication should the integrity of the circuit be compromised, by a short or open within the circuit.

Supervision, double break typical design has both conductors configured as open or closed to activate or deactivate a circuit with an additional circuit added to both conductors that is wired out of correspondence with the main circuit providing a fault indication should the integrity of the circuit be compromised, by a short or open within the circuit.

SECTION 3 – TRAFFIC SIGNAL TIMING/PHASING:

Box 11. The **Phasing Diagram under Normal Operations** requires mapping the phasing in relation to the railroad tracks typically taken from the traffic signal design plans. It is expected that each **Phase number** is recorded upon the respective leg of the intersection diagram and the **Overlaps** with their respective **Parent phases** to be recorded in the **List of Overlaps** box. The **Crossing Street Name**, **Parallel Street Name**, and actual **Number of Tracks** crossing the roadway are to be recorded in the boxes provided, and finally a **North arrow** is expected to be drawn relative to the intersection in the circle provided. The **Notes** box is provided to record any special circumstances about the intersection. For instance, if an alternate diagram other than what is in Box 11 is used and its location, Ex the tracks cross more than one approach to the intersection, i.e., a dual-legged

intersection, or if the intersection is within the traffic signals and possibly traverses through the middle of the intersection. Additional intersection diagrams are provided in Form 2625, *Appendix – Additional Intersection Diagrams*. If the additional intersection diagrams do not sufficiently map the intersection design, a field hand-drawn phasing diagram using Appendix – Intersection Sketch Area is warranted with the requested data. Record a statement in the **Notes** box pertaining to the hand-drawn phasing diagram and its inclusion as an attachment to the inspection form.

Box 12. Controller response time to preempt is the time that elapses while the controller unit electronically registers the preempt call. The controller manufacturer should be consulted to find the correct value for use here. This is not a programmed value but inherent to individual traffic controller models.

Box 13. Worst-case conflicting vehicle phase number(s) is the number of the controller unit phase which conflicts with the phase(s) used to clear the tracks—the track clearance phase(s)—that has the longest sum of minimum green (if provided), other (additional) green time (if provided), yellow change interval, and red clearance interval durations that may need to be serviced during the transition into preemption. Note that all of these time elements are for vehicular phases only; pedestrian phase times will be assessed in the next part of the analysis. The worst-case vehicle phase can be any phase that conflicts with the track clearance phase(s); it is not restricted to only the phases serving traffic parallel to the tracks.

Box 14. Worst-case conflicting pedestrian phase number(s) is the pedestrian phase number (referenced as the vehicle phase number that the pedestrian phase is associated with) that has the longest sum of walk time, pedestrian clearance (i.e., flashing don't walk) times, and associated vehicle clearance times that have to be provided during the transition into preemption. The worst-case pedestrian phase is not restricted to pedestrian phases running concurrently with vehicle phases that serve traffic parallel to the tracks. The vehicle phase associated with the worst-case pedestrian phase may even be one of the track clearance phases if the pedestrian phase is not serviced concurrently with the associated track clearance phase.

For boxes 15 through 17 the Designed track clearance, dwell, and exit settings should be found within the design plans and timing data. The Programmed track clearance, dwell, and exit setting should be recorded from the traffic controller. Note, blank fields are allowed as not all settings pertain to individual intersections. For fields that are recorded, the values entered in column Designed and column Programmed should match each other as well as the design plans and traffic signal timing data. If there is a discrepancy, programming should be changed to match design or contact the Division Railroad Coordinator immediately.

Box 15. Track clearance phase number(s) and **plan number** are associated with the track clearance green interval that clear vehicles queued on the track during a preemption event.

Box 15a. Select the **Preempt Trap resolution.** Preempt may occur during advance preemption operations due to warning time variabilities that ultimately result in drivers queued onto the tracks (see TTI Report 1752-9). Check box:

a. **Gate Down Circuit –** Ensures that the track clearance will not end until the railroad gates are down.
b. **APT+15 –** Timing correction method based on the advance preempt time (APT) provided by the railroad plus 15 additional seconds to approximate when the railroad gate will be done. (Require the use of a not-to-exceed advance preempt timer in the railroad warning system control circuits.)
c. **Simultaneous Preemption –** Preempt trap occurs with the use of advance preempt time.
d. **Other** is for any other resolution not listed above, please describe.

Box 16. Preemption dwell operation and **Dwell plan number** are the associated traffic signal phase(s) provided after a track clearance green interval that allow for continued vehicle movement on phase(s) that do not allow movement toward track and the designated preempt plan number that

transitions the controller to dwell. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 16 for reference.

The dwell operation options include:
Limited service that includes on traffic phases that do not conflict with the grade crossing.
Full service that allows normal operations providing all allowed traffic phases through the intersection.
Flash – all-red that provides red flash indications for all traffic phases.
Flash – red/yellow that provides red flash indications for allowable minor movements through the intersection with yellow flash indications for major allowable movements through the intersection
Other is for any other operation not listed above, please describe. (Example, all red hold). An "*Options List"* is provided at the bottom of page 4 for Box 16 for reference.

If limited service operation is selected, record the associated **Dwell phase number(s)**.

If flash – red/yellow operations is selected, record the associated **Red flash phase number(s)** and **Yellow flash phase number(s)**.
Box 17. Preemption exit phase number(s) and **Exit plan number** are the associated traffic signal phase(s) provided after removal of preemption to serve as transition phase(s) when returning to normal controller timing sequence.

Box 18. Select the **Yellow trap during normal operation and during preemption resolution**. During normal operations, yellow trap may occur when an opposing left turning movement controlled by a protected/permissive or permissive only signal indication transitions to red while the through movement and left turn for the opposite traffic movement (through movement) continues to receive a green indications. Under such conditions, the left turning vehicle may assume that the track clearance through movement has also transitioned to red, leading into a traffic conflict. Under preemption operations, yellow trap may occur when an opposing left turning movement controlled by a protected/permissive or permissive only signal indication transitions to red while the through movement and left turn for the track clearance (through movement) continues to receive a green indications. Under such conditions, the left turning vehicle may assume that the track clearance through movement has also transitioned to red, leading into a traffic conflict.
Remarks may be used to explain why there is no yellow trap, or why yellow trap is still present. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 18 for reference.

The yellow trap resolutions include:
All-red before track clearance green which transitions the entire intersection to an all-red condition regardless of which phases are being serviced at the time of the preemption call, even if one of the active phases is the track clearance movement.
Flashing yellow arrow which give a yielding left turn condition to the turning movement opposing the track clearance phase(s). Since the flashing yellow arrow is tied to the opposing phase through movement, there is no need to terminate the left turn movement and subsequently no yellow trap condition created.
Split phase where there would never be a situation that the phase(s) opposing the track clearance movement(s) would operate at the same time.
No yellow trap where the conflicting left turn phase operate in a protected only mode or does not exist due to intersection geometry.
Yellow trap still present where a yellow trap condition exists and no resolution has been provided.

Box 19. Answer the question "**Is railroad preemption highest priority in the traffic signal controller?**". This may be answered **Yes** based upon two criteria; first, if only one railroad preemption circuit is used and it is set to the highest priority, or if a group of railroad preemption circuits are used then entire group must be set higher than other preemptions. If the answer is **No**, then the following question must be answered "**If no, explain?**" There are reasons why the railroad preemption may not be the highest, for instance, if multiple railroads are preempting the same intersection, but a thorough understanding of why this is the case must be determined.

Box 20. For each of the preemption plan numbers within the traffic signal controller, identify the **Preemption plan purpose** or select **N/A** if the preemption plan number is not used. Use the corresponding number or N/A for the options on the "*Options List"* is provided at the bottom of page 4 in Form 2526 for Box 20 to populate the data.

The preemption plan purpose options are:
Preemption Interconnect Failure where the traffic signal will transition to an all-red flash condition to raise awareness that there is a fault condition.
Advance (Vehicle) Preemption – Track Clearance only plan is to transition through the full right-of-way transfer and holds in the programmed track clearance until another preemption plan takes priority or until the railroad preemption is no longer active. Prior to leaving this plan for another preemption plan, the track clearance green time must be served in its entirety.
Simultaneous Preemption – Track Clearance only plan is to transition through a minimum right-of-way transfer (yellow change and red clearance time only) and holds in the programmed track clearance until another preemption plan takes priority or until the railroad preemption is no longer active. Prior to leaving this plan for another preemption plan, the track clearance green time must be served in its entirety. This plan is intended for locations where a train restarts within the grade crossing approach or for second train events that will not provide total advance preemption time.
Advance (Vehicle) Preemption – Track Clearance & Dwell plan is to transition through the full right-of-way transfer, provides for the programmed track clearance, and then transitions and holds in the dwell programming until another preemption plan takes priority or until the railroad preemption is no longer active. Prior to leaving this plan for another preemption plan, the track clearance green time must be served in its entirety.
Simultaneous Preemption – Track Clearance & dwell plan is to transition through a bare-minimum right-of-way transfer (yellow change and red clearance time only), provides for the programmed track clearance, and then transitions and holds in the dwell programming until another preemption plan takes priority or until the railroad preemption is no longer active. Prior to leaving this plan for another preemption plan, the track clearance green time must be served in its entirety. This plan is intended for locations where a train restarts within the grade crossing approach or for second train events.
Dwell/Limited Service plan holds in the dwell programming until another preemption plan takes priority or until the railroad preemption is no longer active.
Second Track Clearance plan is used in situations where a grade crossing is on two or more legs of an intersection and a second track clearance interval needs to be provided. The plan will hold in the programmed track clearance until another preemption plan takes priority or until the railroad preemption is no longer active. Prior to leaving this plan for another preemption plan, the track clearance green time must be served in its entirety.
Advance Pedestrian Preemption plan is used to provide any programmed walk or pedestrian change time during right-of-way transfer. The plan does not include a track clearance interval and will transition directly from right-of-way transfer to dwelling in full-service vehicle phases while not permitting any new pedestrian movements. The plan will hold in the dwell programming until the advance (vehicle) preemption plan takes priority or until the railroad preemption is no longer active.
N/A is for when a plan is not programmed for a railroad preemption purpose.

For boxes 21 through 32, some fields may remain blank and are to be expected, as not all timing parameters will be used in each preempt plan. For fields that are recorded, the values entered in column D and column P should match each other as well as the traffic signal timing data. If there is a discrepancy, programming should be changed to match design or contact the Division Railroad Coordinator immediately.

Box 21. Preempt delay time is the time that the traffic signal controller is programmed to wait from the initial receipt of a preempt call until the call is "verified" and considered a viable request for transfer into preemption mode. Preempt delay time should be a whole number value entered into the controller unit for purposes of preempt call validation and may not be available on all manufacturer's controllers. For each preempt plan, enter the associated preempt delay time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 22. Minimum green time during right-of-way transfer is the minimum time that any existing phase will display a green indication before the controller unit will terminate the phase through its yellow change and red clearance intervals and transition to the track clearance green interval. Note that this value is not the same as a minimum green value during normal operation; it only comes into play when a preempt call is received from the railroad. For each preempt plan, enter the associated minimum green time during right-of-way transfer from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 23. Other green time during right-of-way transfer is any additional green time beyond the preempt minimum green time for the worst-case conflicting vehicle phase. Given the time-critical nature of the transition to the track clearance green interval during preempted operation, this value is usually zero except in unusual circumstances. One situation where other green time may be present is when a trailing green overlap is used on the worst-case vehicle phase, and the controller unit is set up to time out the trailing green overlap on entry into preemption. For each preempt plan, enter the associated other green time during right-of-way transfer from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 24. Yellow change time is the required yellow change interval time during right-of-way transfer prior to the track clearance. Section 4D.13 of the TMUTCD states that the normal yellow change interval shall not be shortened or omitted during the transition into preemption control. For each preempt plan, enter the associated yellow change time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s). Note, depending on the type of controller the yellow change time could be programmed to a 0(zero), 0.1, 255, or another program indicator for the controller to revert to the normal phase programming. In these instances, the yellow change time should be recorded from the normal phase programming.

Box 25. Red clearance time is the required red clearance interval time during right-of-way transfer prior to transition to track clearance. Section 4D.13 of the TMUTCD states that the normal red clearance interval shall not be shortened or omitted during the transition into preemption control. For each preempt plan, enter the associated red clearance time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s). Note, depending on the type of controller the yellow change time could be programmed to a 0(zero), 0.1, 255, or another program indicator for the controller to revert to the normal phase programming. In these instances, the yellow change time should be recorded from the normal phase programming.

Box 26. Minimum walk time during right-of-way transfer is the minimum pedestrian walk indication time. The TMUTCD permits the shortening (i.e. truncation) or complete omission of the pedestrian walk interval. For each preempt plan, enter the associated minimum walk time during right-of-way transfer from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 27. Pedestrian change time during right-of-way transfer is the time a pedestrian is provided for crossing (i.e., flashing “don’t walk” indication). The TMUTCD permits the shortening (i.e. truncation) or complete omission of the pedestrian clearance interval. For each preempt plan, enter the associated pedestrian change time during right-of-way transfer from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s). These values should match each other as well as the traffic signal timing data. If there is a discrepancy contact the Division Railroad Coordinator immediately.

Box 28. Track clearance green time [minimum with gate down] is the time for the preempt plan with the purpose of dwell/limited service to allow for a minimum amount of green time directly after the railroad gate(s) reach the horizontal position. For each preempt plan, enter the associated track clearance green time minimum from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 29. Track clearance green extension time after gate down is the programmed amount of time that a track clearance phase's(s') green is extended once the gate is down. For each preempt plan, enter the associated gate down extension time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 30. Preempt duration time is the minimum time the preemption program is active until it is released at the expiration of the allotted time. For each preempt plan, enter the associated preempt duration time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 31. Minimum dwell time is the minimum time from when dwell phase(s) are active until the traffic controller may enter the exit phase(s). For each preempt plan, enter the associated minimum dwell time from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

Box 32. A **Maximum preemption timer** is a timer that can be set to specify the maximum time a signal can remain in preemption before the traffic controller assumes the preemption circuit has failed and reverts to a flashing red signal. For each preempt plan, enter the associated maximum preemption time in minutes from the design plans in the **D** column(s), followed by the programmed time from the traffic controller in the **P** column(s).

SECTION 4 – RAILROAD DATA:
Railroad designed preemption programming will be obtained from the existing railroad circuit plans in the railroad equipment house. The railroad preemption programming will be the actual observed programming from the railroad predictor not from the railroad design prints. The railroad representative will provide these values during the on-site inspection.

Box 33. Railroad equipment – Predictor Model - record actual predictor model name. Ex HXP3R2, XP4, GCP4000. An "*Options List"* is provided at the bottom of page 4 in Form 2625 for Box 33 for reference. Also, answer the question "**Changed since last inspection?**" pertaining to the railroad equipment controller and if it had to be replaced since last inspection, if yes record the previous **Predictor Model**. If there has never been a previous inspection the answer is **N/A**.

Box 34. Type of preemption – check all types of preemption provided by the railroad.

Box 35. Track # 1 – Main Designed and **Programmed Values** – record the designed times/distances from the railroad design prints and programmed times/distances from the railroad controller. Next, record the **Railroad Designed Speed (mph)** obtained from the railroad representative.

a. **Warning time** – record the designed and programmed amount of time the active warning devices shall operate prior to the arrival of a train at a grade crossing. Or check **N/A** if crossing does not use a designed/programmed warning time, such as, an island only crossing. Please note in remarks.
b. **Advance preempt timer –** record the designed and programmed amount of time from when preemption is active until the railroad warning devices activate. Or check **N/A** if gate down logic is used in-lieu of a timer (this may still be designed/programmed even if gate down logic is used) or the intersection is simultaneously preempted. Please note in remarks.
c. **Preempt warning time (Vehicle)** – record the designed and programmed amount of vehicle preemption time provided. Or check **N/A** if the grade crossing is simultaneously preempted. Please note in remarks.
d. **Pedestrian preempt warning time** – record the designed and programmed amount of pedestrian preemption time provided. Or check **N/A** if pedestrian preemption is not designed/programmed.
e. **Approach (feet)** – record the designed and programmed railroad approach in feet. The total

approach designed, and the programmed approach may differ due to the crossing being controlled through an adjacent crossing or remote location (DAX). Please note in remarks. Or check **N/A** if grade crossing is island only or other method of activating preemption instead of a railroad approach circuit is designed/programmed.

f. **Approach field measured (feet) [If applicable]** – record the total approach measured if measured during the inspection.

Box 36. Track # 2 - Designed and **Programmed Values –** Check the box that describes the second track designation or **N/A** if one does not exist. If the grade crossing has a second track record the designed times/distances from the railroad design prints and programmed times/distances from the railroad controller. Next, record the **Railroad Designed Speed (mph)** obtained from the railroad representative (maximum track speed may be different from track to track). Value for **a** through **f** are determined in the same fashion as box 35.

Box 37. Are there more than 2 physical or programmed tracks at the grade crossing? – Check box **Yes** or **No**. If yes, include additional track data in appendix.

Box 38. Do railroad switching moves take place at or within the approaches for this grade crossing? - Check box **Yes** or **No**.

Box 39. Is the grade crossing controlled through an adjacent crossing or remote location? - Check box **Yes** or **No**. Grade crossings can be controlled through adjacent crossings or remote locations due to the design limitations of the railroad signaling on the track. These locations are commonly known as Downstream Adjacent Crossings (DAX) . The DAX is used to go around physical (electronic) barriers on the track to complete the full approach circuit. DAXs are noted in the circuit plans of the crossing. Each DAX is individually programmed with a warning time or DAX warning time; an offset distance from the main crossing; and an approach distance to the DAX point (insulated joint). If yes, include DAX location information in appendix.

SECTION 5 – TRAFFIC SIGNAL/ACTIVE WARNING PREEMPTION TESTING:

Traffic signal/active warning preemption testing will require coordination between the agency and railroad personnel for the activation, observation and recording of required data from the traffic signal equipment and displays. Railroad personnel are required to be present to provide track safety and initiation of the preemption sequence from the railroad equipment house. It is imperative after each test to ensure that the traffic signal equipment, railroad active warning equipment, interconnect cabling and all preemption circuits are in full operation before starting the next test.

Box 40. Record **Method used for advance (vehicle) testing** initiation preemption sequence in railroad equipment house. Check box:

a. **Test switch –** preemption sequence started by opening preemption test switch found in the railroad equipment house.
b. **Open relay –** preemption sequence started by physical opening preemption relay located in the railroad equipment house.
c. **Train activation –** preemption sequence started by train movement through grade crossing.
d. **Other –** preemption sequence started by any means other than listed. Note how preemption sequence started. Example: shunting a track circuit.

Box 41. Record **Method used for advance pedestrian testing** initiation preemption sequence in railroad equipment house. Check box:

a. **N/A –** advance pedestrian preemption is not used.
b. **Test switch –** preemption sequence started by opening preemption test switch found in the railroad equipment house.
c. **Open relay –** preemption sequence started by physical opening preemption relay located in the railroad equipment house.

d. **Train activation –** preemption sequence started by train movement through grade crossing.
e. **Other –** preemption sequence started by any means other than listed. Note how preemption sequence started. Example: shunting a track circuit.

Box 42. Record **Method used for crossing active testing** initiation preemption sequence in railroad equipment house. Check box:
a. **N/A –** crossing active circuit is not used.
b. **Test switch –** preemption sequence started by opening preemption test switch found in the railroad equipment house.
c. **Open relay –** preemption sequence started by physical opening preemption relay located in the railroad equipment house.
d. **Train activation –** preemption sequence started by train movement through grade crossing.
e. **Other –** preemption sequence started by any means other than listed. Note how preemption sequence started. Example: shunting a track circuit.

Box 43. Record **Preemption test during worst-case vehicle phase(s) – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. Provide **Field measured Right-of-Way Transfer Time (RWTT)** in seconds.
c. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure: As soon as the phase(s) with the worse-case conflicting vehicle movement (generally a through movement or left turn towards track as identified in timing data) displays green, initiate the advance preemption sequence (as described in box 40) and start timing the RWTT. After the display of minimum green time during right-of-way transfer, yellow change time and red clearance time on the worse-case conflicting vehicle movement, the track clearance green indication will be displayed. Stop the timing for RWTT at the display of the track clearance green.

Box 44. Record **Preemption test during best-case vehicle phase(s) – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. Provide **Field measured RWTT** in seconds.
c. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure: **(Reference Box 18 for correct operation)**

If Box 18 – Yellow Trap – During preemption operation resolution is “All-red before track clearance green“

As soon as the phase(s) with the best-case vehicle movement (track clearance phase(s)) displays green, initiate the advance preemption sequence (as described in box 40) and start timing the RWTT. After the display of minimum green time during right-of-way transfer, yellow change time and red clearance time on the best-case vehicle movement, the track clearance green indication will be displayed. Stop the timing for RWTT at the display of the track clearance green.

If Box 18 – Yellow Trap – During preemption operation resolution is “Split Phase or No Yellow Trap”

As soon as the phase(s) with the best-case vehicle movement (track clearance phase(s)) displays green, initiate the advance preemption sequence (as described in box 40). The track clearance green time will immediately start timing with no changes to the vehicle indication. (RWTT will be 0)

If Box 18 – Yellow Trap – During preemption operation resolution is “Flashing yellow arrow or yellow trap still present”

As soon as the phase(s) with the best-case vehicle movement (track clearance phase(s)) displays green, initiate the advance preemption sequence (as described in box 40) and start timing the RWTT. After the display of minimum green time during right-of-way transfer (either flashing yellow arrow or green ball), yellow change time and red clearance time for the opposing left turn, the track

clearance green indication will be displayed. Stop the timing for RWTT at the display of the track clearance green.

Box 45. Record **Preemption test during worst-case pedestrian phase(s) – Operating as designed?**

a. Check box: **Yes**, **No** or **N/A**.
b. Provide **Field measured RWTT** in seconds.
c. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure: Press the pedestrian button for the worst-case conflicting pedestrian movement. When the WALK indication appears, immediately start the advance preemption sequence (as described in box 40) and start timing the RWTT. The WALK indication should transition to a FLASHING DON'T WALK. During this transition the FLASHING DON'T WALK will time along with minimum green time during right-of-way transfer, yellow change time and red clearance time. At the end of this sequence the track clearance green indication will be displayed. Stop the timing for RWTT at the display of the track clearance green.

Box 46. Record **Track clearance reservice/second train test – Operating as designed?**

a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure:
Initiate preemption by activating the advance preemption sequence (as described in box 40). Allow traffic signal to advance through RWTT and into track clearance interval. When the track clearance interval displays terminate the advance preemption sequence. Wait until the traffic signal displays a yellow indication for the track clearance interval and immediately start the simultaneous preemption sequence by activating the crossing active circuit (as described in box 42). The traffic signal should return to the track clearance interval. Terminate the simultaneous preemption sequence.

Box 47. Record **Advance pedestrian preemption test – Operating as designed?**

a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure: Press the pedestrian button for the crosswalk crossing the parallel street. When the WALK indication appears immediately start the advance pedestrian preemption sequence (as described in box 41). The WALK indication should transition to a FLASHING DON'T WALK and run the designed pedestrian clearance time. At the expiration of the designed advance pedestrian preemption time, immediately start the advance (vehicle) preemption sequence (as described in box 40). During this transition, the FLASHING DON'T WALK immediately display a SOLID DON'T WALK and after the remaining transfer time has expired the track clearance green indication will be displayed.

Box 48. Record **Crossing active circuit test – Operating as designed?**

a. Check box: **Yes**, **No** or **N/A**.
b. Provide **Field measured RWTT** in seconds.
c. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure: Start the simultaneous preemption sequence by activating the crossing active circuit (as described in box 42). The railroad active warning system will immediately activate, start timing the RWTT. During this transition, the traffic signal should immediately terminate any active pedestrian phases and provide the programmed minimum green time during right-of-way transfer, yellow change time and red clearance time. Stop timing the RWTT at the display of the track clearance green indication.

Box 49. Record **Gate down circuit test – Operating as designed?**

a. Check box: **Yes**, **No** or **N/A**.

b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedures:
Normal operation test - Start the advance preemption sequence (as described in box 40). After the RWTT and transition to the track clearance green interval, and the activation of the railroad active warning system, the railroad automatic gate(s) will reach the horizontal position and terminate the track clearance green interval after the programmed track clearance green time minimum and gate down extension time. The traffic signal will transition into the limited service/dwell program until the preemption sequence is terminated.

Obstructed gate(s) test - Start the advance preemption sequence (as described in box 40). Then hold the gate in the track clearance direction up > 5° horizontal for more than track clearance green time. The traffic signal indication should hold in track clearance green for as long as the gate is held up. Allow the gate to lower down to horizontal. The traffic signal should terminate the track clearance green and proceed to dwell/limited service. If there is a second gate or more in the approach of the track clearance phase, lift the second gate up > 5° horizontal and ensure the gate down circuit deactivates in the traffic signal cabinet. Perform the second gate lift test for anymore subsequent gates in the approach of the track clearance phase.
While the gates are horizontal, lift the gate(s) in the opposite direction up > 5° horizontal and ensure the gate down circuit does not deactivate in the traffic signal cabinet.

Box 50. Record **Supervised circuit test – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedures:
Shorted cable test – Install jumper(s) between the advance preemption output(s) and supervised circuit output(s) in railroad house. The traffic signal should immediately terminate any active vehicle or pedestrian phases after the programmed minimum green time during right-of-way transfer, yellow change time and red clearance time have been displayed, and transition to the track clearance interval for the track clearance green time minimum. After the track clearance interval, the traffic signal will revert to an all-red flash condition until the installed jumper(s) is(are) removed. Remove jumper(s) between the advance preemption output(s) and supervised circuit output(s) after completion of test.

Cut cable test – Open test strap(s) or disconnect the supervised circuit output(s). Initiate the advance preemption sequence (as described in box 40). The traffic signal should immediately terminate any active vehicle or pedestrian phases after the programmed minimum green time during right-of-way transfer, yellow change time and red clearance time have been displayed and transition to the track clearance interval for the track clearance green time minimum. After the track clearance interval, the traffic signal will revert to an all-red flash condition until the preemption sequence is terminated or the open test strap(s) is(are) connected. Close test strap(s) or reconnect supervised circuit outputs(s) after completion of test.

Box 51. Record **Traffic signal health test – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedures:
Traffic signal in all-red flash condition – Place traffic signal in all-red flash condition (conflict or programmed). Initiate the advance preemption sequence (as described in box 40). The railroad active warning system should activate immediately at the initiation of the advance preemption sequence. Return traffic signal to full operation after test.

Traffic signal in simulated power loss condition – De-energize traffic signal health circuit in the traffic signal cabinet. Initiate the advance preemption sequence (as described in box 40). The railroad

active warning system should activate immediately at the initiation of the advance preemption sequence. Energize traffic signal health circuit after test.

Box 52. Record **Backup power supply test – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedures:
1. Verify backup power supply storage voltage is within device specifications with commercial power on.
2. Disconnect commercial power from traffic signal cabinet and verify that backup power supply switches on and provides power to traffic signal.
3. Return commercial power to traffic signal cabinet and verify that backup power supply switches back to commercial power operation.
4. Check backup power supply for cleanliness and any signs of damage, disrepair, leakage or compromise.

Box 53. Record **Blank out sign(s) test – Operating as designed?**
a. Check box: **Yes**, **No** or **N/A**.
b. **Remarks**, if any, about test should be recorded in the space provided.

Testing procedure:
Verify which circuit that activates the blank out sign(s) (advance preemption circuit or simultaneous preemption circuit). Initiate the preemption sequence that activates the blank out sign(s) by activating the appropriate circuit (as described in box 40 or box 42). During the activation of the preemption circuit and preemption sequence, observe that the blank out sign(s) are fully functional and present an unobstructed display. After verification of the operation of the blank out sign(s), terminate the preemption sequence. Continue to observe the blank out sign(s) to ensure the sign(s) fully extinguish.

Appendix – Pre-Signal Data

Use this appendix only if a pre-signal is present at the subject crossing.

Box 54. Describe the location of the pre-signal in relation to the railroad tracks.
a. **Upstream –** Pre-signal is on the nearside of the railroad tracks.
b. **Downstream –** Pre-signal is on the far side of the railroad tracks.
c. **Remarks –** if any, about the pre-signal location.

Box 55. Answer the question "**Do motorists routinely stop at pre-signal stop line?**"
a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about observations should be recorded in the space provided.

Box 56. Answer the question "**Are right turns on red restricted across the railroad tracks?**"
Could be a permanent restriction, restricted by signal indication, or signage.
a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about any turn restrictions should be recorded in the space provided.

Box 57. Answer the question "**Are the downstream signal indications visible at the pre-signal stop line?**"
a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about any downstream signal visibility should be recorded in the space provided.

Box 58. Answer the question "**Are the pre-signal indications ball or thru arrow indications only?**"

a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about any turn arrow indications for pre-signal should be recorded in the space provided.

Box 59. Answer the question "**Is the pre-signal progressively time with the downstream signals?**"
a. Check box: **Yes** or **No**.
b. **Designed Clearance Time**, record designed clearance time.
c. Programmed Clearance Time, record the clearance time programmed in the traffic controller.

Box 60. Answer the question **"Is a "Stop Here on Red", R10-6 sign installed adjacent to the pre-signal stop line?**"
a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about "Stop Here on Red" R10-6 sign should be recorded in the space provided.

Box 61. Answer the question "**Is the stop line for the pre-signal located at least 40 feet from the indications?**"
a. Check box: **Yes** or **No**.
b. **If no, what is the measurement,** measure and record the distance from the pre-signal to the stop line.

Box 62. Answer the question "**Do the pre-signal indications change to and remain red during preemption?**"
a. Check box: **Yes** or **No**.
b. **Remarks**, if any, about the pre-signal operation during preemption should be recorded in the space provided