

Ref: 7943

September 26, 2018

Mr. Fred Hamwey, P.E.  
Principal  
Hamwey Engineering Inc.  
46 Austin Street  
Leominster, MA 01453

Re: Supplemental Traffic Engineering Peer Review  
Goodridge Brook Estates – Sterling Road  
Lancaster, Massachusetts

Dear Fred:

Vanasse & Associates, Inc. (VAI) has completed a review of the supplemental materials submitted on behalf of Crescent Builders, Inc. (the “Applicant”) in support of the proposed Goodridge Brook Estates residential development to be located off Sterling Road in Lancaster, Massachusetts (hereafter referred to as the “Project”). This information was prepared in response to the comments that were raised in our July 27, 2018 review letter and consisted of a letter dated September 18, 2018 prepared by Green International Affiliates, Inc. (Green) and Site Plans revised through September 18, 2018 titled *Site Development Plan of Land* prepared by GLM Engineering Consultants, Inc.

Based on our review of supplemental information, we are generally satisfied that the Applicant has addressed our comments regarding the June 2018 *Traffic Impact and Access Study* (the “June 2018 TIAS”). The Applicant has demonstrated that the transportation infrastructure affords sufficient capacity to accommodate the increase in traffic that the Project represents. We continue to suggest that the Applicant commit to: i) installing or providing monies to the Town for the construction of a sidewalk along Sterling Road; and ii) assist the Town in advancing improvements at the Sterling Road/Deershorn Road intersection. The majority of our comments pertaining to the Site Plans remain outstanding and should be addressed in order to demonstrate that the Project is designed to function in a safe and efficient manner.

For reference, listed below are the comments that were raised in our July 27, 2018 review letter that required additional information or analysis followed by a summary of the response submitted on behalf of the Applicant, with additional comments indicated in **bolded** text for identification.

## **JUNE 2018 TRAFFIC IMPACT AND ACCESS STUDY**

### **General**

**Comment:** *A letter should be provided by the Professional Engineer attesting to their oversight in preparing the document and providing their Massachusetts Professional Engineer Registration number and discipline.*

**Response:** The Applicant's engineer provided the requested certification statement. **No further response required.**

### **Existing Conditions**

#### **Study Area**

**Comment:** *Given the expected trip distribution pattern for the Project, the study area should be expanded to include the intersection of Sterling Street (Route 62) at Chase Hill Road. In addition, a discussion of the impact of the Project at the Sterling Hill Road/George Hill Road intersection should be provided given its proximity to the Sterling Road/Deershorn Road intersections.*

**Response:** After subsequent discussion with the Applicant's engineer, the study area was expanded to include the intersection of Deershorn Road at South Meadow Road and traffic count data (manual turning movement counts and vehicle classification counts) were performed at the Deershorn Road/South Meadow Road and Sterling Hill Road/George Hill Road intersections during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods on Wednesday, September 5, 2018. The existing traffic volumes were projected to 2025 following the methodology described in the June 2018 TIAS and the peak-hour traffic volumes associated with the Project were then added to the intersections. A traffic operations analysis was performed for the intersections in order to determine the impact that the Project may have on motorist delays and vehicle queuing.

Based on this analysis, the Applicant's engineer concluded that the Project will add between 40 and 50 vehicles to the Deershorn Road/South Meadow Road intersection and between 74 and 93 vehicles to the Sterling Hill Road/George Hill Road intersection during the weekday peak hours, a level of impact that was not shown to result in a significant change in operating conditions (i.e., increase in motorist delay or vehicle queuing) at the subject intersections, with the vehicle queues predicted to increase by approximately one (1) vehicle. **No further response required.**

#### **Pedestrian and Bicycle Facilities**

**Comment:** *A description of existing and planned future bicycle accommodations within the study area and their relationship to the Project site should be provided.*

**Response:** The Applicant's engineer conducted a review of the study area roadways and consulted with the Town and MassDOT, and confirmed that there are no existing or planned future bicycle facilities within the study area. **No further response required.**



## **Future Conditions**

### **No-Build Conditions**

**Comment:** *The Applicant's engineer should consult with MassDOT and the Town in order to determine if there are any planned roadway improvement projects within the study area that would impact traffic volumes, trip patterns or operating conditions.*

**Response:** The Applicant's engineer consulted with the Town, MassDOT and the Montachusett Regional Planning Commission (MRPC), and determined that there are no planned roadway improvement projects within the study area that would impact traffic volumes, trip patterns or operating conditions. **No further response required.**

### **Build Conditions**

**Comment:** *With regard to the trip distribution, we are in general agreement with the orientation of trips; however, we would suggest that a portion of the trips assigned to Deershorn Road (35 percent) should be distributed to Route 62 south of Sterling Road (Sterling Street) as residents of the Project may choose direct access to Route 62.*

**Response:** The Applicant's engineer provided the basis for the routing of Project-related trips to Route 62 via Sterling Road vs. Deershorn Road. To the extent that the Project may add traffic to the Route 62/Sterling Road intersection beyond that contemplated in the June 2018 TIAS, our review indicates that the intersection affords sufficient capacity to accommodate a modest increase in traffic. **No further response required.**

Updated traffic volume projections were also provided for the Project to reflect a decrease in the number of multi-family units from 136 units as assessed in the June 2018 TIAS to 120 units. The reduction in the number of multi-family units was shown to result in a decrease in peak-hour traffic associated with the Project of between seven (7) and nine (9) vehicle trips.

## **Sight Distance**

**Comment:** *In order to ascertain the extent of the tree/vegetation trimming and removal, the sight triangle areas for the Project site roadways/driveway should be added to the Site Plans (discussion follows).*

**Response:** The Applicant's engineer indicated that the sight triangle areas will be added to the Site Plans. **We note that the sight triangle areas were not included as a part of the most recent revisions to the Site Plans (discussion follows).**

## **Recommendations**

**Comment 1:** *Design and construct a sidewalk along the Project site frontage on Sterling Road or provide monies to the Town to be used for sidewalk construction along the roadway;*

**Response:** The Applicant has indicated that they are constructing sidewalks within the Project and that constructing a sidewalk along Sterling Road would not provide a safe pedestrian connection to any existing or planned pedestrian facilities.

**We continue to suggest that the Applicant either: i) construct a sidewalk along the Project site frontage that would link the driveway to the multi-family development to the sidewalk along Road "A"; or ii) provide monies to the Town to be used for the construction of a sidewalk along Sterling Road in an amount equivalent to the cost to construct the aforementioned sidewalk segment.**

**Comment 2:** *Prepare a Functional Design Report (FDR) and associated MassDOT 25 Percent Design Plans for the implementation of the suggested traffic flow and safety improvements at the Sterling Road/Deershorn Road intersection. This information (FDR and 25 Percent Design Plans) can be used by the Town to apply for State funding for the construction of improvements at the intersection; and*

**Response:** The Applicant's engineer indicated that the Project will have a minor impact at the Sterling Road/Deershorn Road intersection and that there were no defined safety deficiencies identified at the intersection. As such, no improvements or further study of the intersection is justified as a result of the Project.

**The Applicant's engineer identified the need to consider safety and traffic flow improvements at the Sterling Road/Deershorn Road intersection in conjunction with the preparation of the June 2018 TIAS, an intersection through which it was estimated that approximately 65 percent of the traffic associated with the Project will travel. Accordingly, we continue to suggest that the Applicant assist the Town in advancing potential improvement measures to simplify traffic movements at the intersection and reduce the number of potential conflict points. We would recommend that the Applicant commit to conducting a feasibility study of potential improvements to the intersection, including the development of concept plans for the improvements that were suggested in the June 2018 TIAS, and that the cost of this study be capped at \$5,000.**

**Comment 3:** *Traffic control devices associated with the at-grade railroad crossing of Sterling Road (i.e., signs, pavement markings and warning lights/gates) should be reviewed and upgraded as may be necessary to meet the current requirements of the MUTCD.*

**Response:** The Applicant has committed to installing STOP lines and "STOP Here When Flashing" (R8-10) signs on both Sterling Road approaches to the at-grade railroad crossing in order to enhance safety at the crossing. **In addition, we would recommend that an at-grade crossing warning sign (W10-1) be installed on Sterling Road east of the crossing and**



that the requisite pavement markings for an at-grade railroad crossing be installed on both approaches to the crossing pursuant to the requirements of the *Manual on Uniform Traffic Control Devices (MUTCD)*<sup>1</sup> and illustrated on Figures 8B-6 and 8B-7 (attached). These improvements should be a condition of any approvals that may be granted for the Project. No further response required.

## **SITE PLANS**

**Comment 1:** *A truck turning analysis should be provided for the Lancaster Fire Department design vehicle, a school bus (to the extent that a school bus will be accessing the Project) and a single-unit (SU) truck (representative of a moving/delivery truck, trash/refuse truck or similar). The turning analysis should demonstrate that the subject vehicles can access and circulate within the Project in an unimpeded manner.*

**Response:** **The requested analysis was not provided and this comment remains outstanding.**

**Comment 2:** *Internal to the Project site, circulating roads and drive aisles should be a minimum of 22-feet in width for two-way travel and 23-feet where adjacent to perpendicular parking, or as required to accommodate truck access and fire truck turning maneuvers.*

**Response:** Circulating roads within the multi-family component of the Project are proposed to be 24-feet in width and those within the single-family component are proposed to be 22-feet in width. **No further response required pending receipt of the truck turning analyses.**

**Comment 3:** *Fire lanes and/or emergency access drives, where provided, should be a minimum of 20-feet in width pursuant to the requirements of NFPA® 1.<sup>2</sup>*

**Response:** No response required.

**Comment 4:** *Unless otherwise approved by the Fire Department, a secondary means of access for emergency vehicles should be provided to the multi-family residential development given the number of units that are proposed (136 units) and the length of the access roadway.*

**Response:** **This comment remains outstanding. The Applicant should provide a letter from the Fire Department indicating that a single means of access to the multi-family component of the Project is acceptable.**

**Comment 5:** *To the extent that the Town may wish to develop an access to the property along the north side of Sterling Road opposite the Project site, Road "C" should be shifted to the west to align with the Town right-of-way that has been reserved for such access.*

**Response:** **This comment remains outstanding.**

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<sup>1</sup>Ibid 3.

<sup>2</sup>National Fire Protection Association (NFPA)® 1, *Fire Code*, Seventh Edition; NFPA; Quincy, Massachusetts; 2015; as amended per 527 CMR.

**Comment 6:** *The Applicant should provide a turn-around area at the end of each of the drive aisles for the multi-family residential buildings pursuant to the requirements of NFPA® 1 or provide a letter from the Fire Department indicating their acceptance of the access given that the current design requires a backing maneuver for emergency vehicles that exceeds 150-feet.*

**Response:** **This comment remains outstanding. The Applicant should provide a letter from the Fire Department indicating their acceptance of the accommodations that are provided for emergency vehicles within the multi-family component of the Project.**

**Comment 7:** *Circulation around the traffic circle at the front of the southern multi-family residential buildings should be directed in a one-way counterclockwise direction, with appropriate signs and pavement markings provided to regulate the one-way circulation pattern.*

**Response:** The traffic circle has been removed from the multi-family residential development leaving a wide, undefined pavement area. **It is suggested that the Applicant reintroduce either a raised or flush island/circle within the circular area to provide definition to the traveled-way. Appropriate signs and pavement marking should also be added.**

**Comment 8:** *A sign and pavement marking plan should be developed for the Project and included as a part of the Site Plans.*

**Response:** STOP-signs and marked STOP lines have been added to internal intersections within the Project site. **These accommodations should be expanded to include STOP-signs and marked STOP lines on the Project site roadway approaches to Sterling Road, as well as crosswalks at all pedestrian crossing locations.**

**Comment 9:** *A sidewalk has been provided along one side of Road "A", Road "B" and the driveway to the multi-family development that extend to Sterling Road. A sidewalk should also be provided along Road "C" that extends to Sterling Road. In addition, pedestrian crossings should be provided at appropriate locations within the Project that should include marked crosswalks with Americans with Disabilities Act (ADA) compliant wheelchair ramps. These crossings should be shown on the Site Plans.*

**Response:** A sidewalk has been added to Road "C" that extends to Sterling Road and ADA compliant wheelchair ramps are provided at proposed pedestrian crossings. **No further response required.**

**Comment 10:** *Consideration should be given to providing a sidewalk along the Project site frontage on Sterling Road between the multi-family driveway and Road "A" as discussed previously.*

**Response:** **As stated previously, we suggest that the Applicant either: i) construct a sidewalk along the Project site frontage that would link the driveway to the multi-family development to the sidewalk along Road "A"; or ii) provide monies to the Town to be used for the construction of a sidewalk along Sterling Road in an amount equivalent to the cost to construct the aforementioned sidewalk segment.**





**Comment 11:** *The sight triangle areas for the Project site roadways/driveway intersections should be shown on the Site Plans along with a note to indicate: “Signs, landscaping and other features located within sight triangle areas shall be designed, installed and maintained so as not to exceed 2.5-feet in height. Snow windrows located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed.”*

**Response:** **This comment remains outstanding.**

**Comment 12:** *A note should be added to the Site Plans stating: “All Signs and pavement markings to be installed within the Project site shall conform to the applicable specifications of the Manual on Uniform Traffic Control Devices (MUTCD).<sup>3</sup>”*

**Response:** **This comment remains outstanding.**

**Comment 13:** *Where provided, double-yellow centerline pavement markings should consist of two parallel double-yellow lines.*

**Response:** No response required.

**Comment 14:** *A narrative should be provided indicating how tenant moves for the multi-family component of the Project will be managed. The location of the moving vehicle staging area should be reflected in the truck turning analysis and include the required maneuvers for the subject vehicle to enter and exit the Project site.*

**Response:** **This comment remains outstanding.**

**Comment 15:** *A narrative should be provided indicating how trash/recycling will be managed for the multi-family component of the Project, including the location where these items will be picked-up. The pick-up location should be reflected in the truck turning analysis.*

**Response:** **This comment remains outstanding.**

**Comment 16:** *Secure bicycle parking should be provided for the multi-family component of the Project consisting of exterior bicycle racks for each building and weather protected bicycle storage.*

**Response:** **This comment remains outstanding.**

**Comment 17:** *The Applicant should consult with the Lancaster School Department to define the location of the school bus waiting areas for the Project.*

**Response:** **The Applicant should provide an update on their discussions with the School Department.**

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<sup>3</sup>Ibid 3.

**Comment 18:** *Consideration should be given to accommodating electric vehicle (EV) charging stations within the multi-family component of the Project.*

**Response:** **A response to this suggestion should be provided.**

## **PARKING**

**Comments:** *For the multi-family component, we recommend that the Site Plans be revised to accommodate a minimum parking ratio of 1.5 spaces per dwelling unit, with additional parking spaces provided to accommodate visitors, staff and prospective tenants.*

**Response:** The number of units within the multi-family component of the Project has been reduced to 120-units that will be served by 204 parking spaces, or a parking ratio of 1.7 spaces per unit. This parking ratio is consistent with that documented by the Institute of Transportation Engineers (ITE) for an apartment community in a suburban setting<sup>4</sup> and should be sufficient to accommodate the parking demands for this component of the Project. **No further response required.**

## **SUMMARY**

VAI has completed a review of the supplemental materials submitted on behalf of Crescent Builders, Inc. in support of the proposed Goodridge Brook Estates residential development to be located off Sterling Road in Lancaster, Massachusetts. This information was prepared in response to the comments that were raised in our July 27, 2018 review letter and consisted of a letter dated September 18, 2018 prepared by Green and Site Plans revised through September 18, 2018 titled *Site Development Plan of Land* prepared by GLM Engineering Consultants, Inc.

Based on our review of supplemental information, we are generally satisfied that the Applicant has addressed our comments regarding the June 2018 TIAS. The Applicant has demonstrated that the transportation infrastructure affords sufficient capacity to accommodate the increase in traffic that the Project represents. We continue to suggest that the Applicant commit to: i) installing or providing monies to the Town for the construction of a sidewalk along Sterling Road; and ii) assist the Town in advancing improvements at the Sterling Road/Deershorn Road intersection. The majority of our comments pertaining to the Site Plans remain outstanding and should be addressed in order to demonstrate that the Project is designed to function in a safe and efficient manner. Written responses to our comments should be provided so that we can continue our review of the Project on behalf of the Town.

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<sup>4</sup>*Parking Generation*, 4<sup>th</sup> Edition; Institute of Transportation Engineers; Washington, D.C.; 2010. The average observed peak parking demand for an apartment community was found to be 1.23 vehicles per dwelling unit with an 85<sup>th</sup> percentile peak parking demand of 1.94 vehicles per dwelling unit.



Mr. Fred Hamwey, P.E.  
September 26, 2018  
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This concludes our review of the materials that have been submitted to date in support of the Project. If you should have any questions regarding our review, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE  
Principal

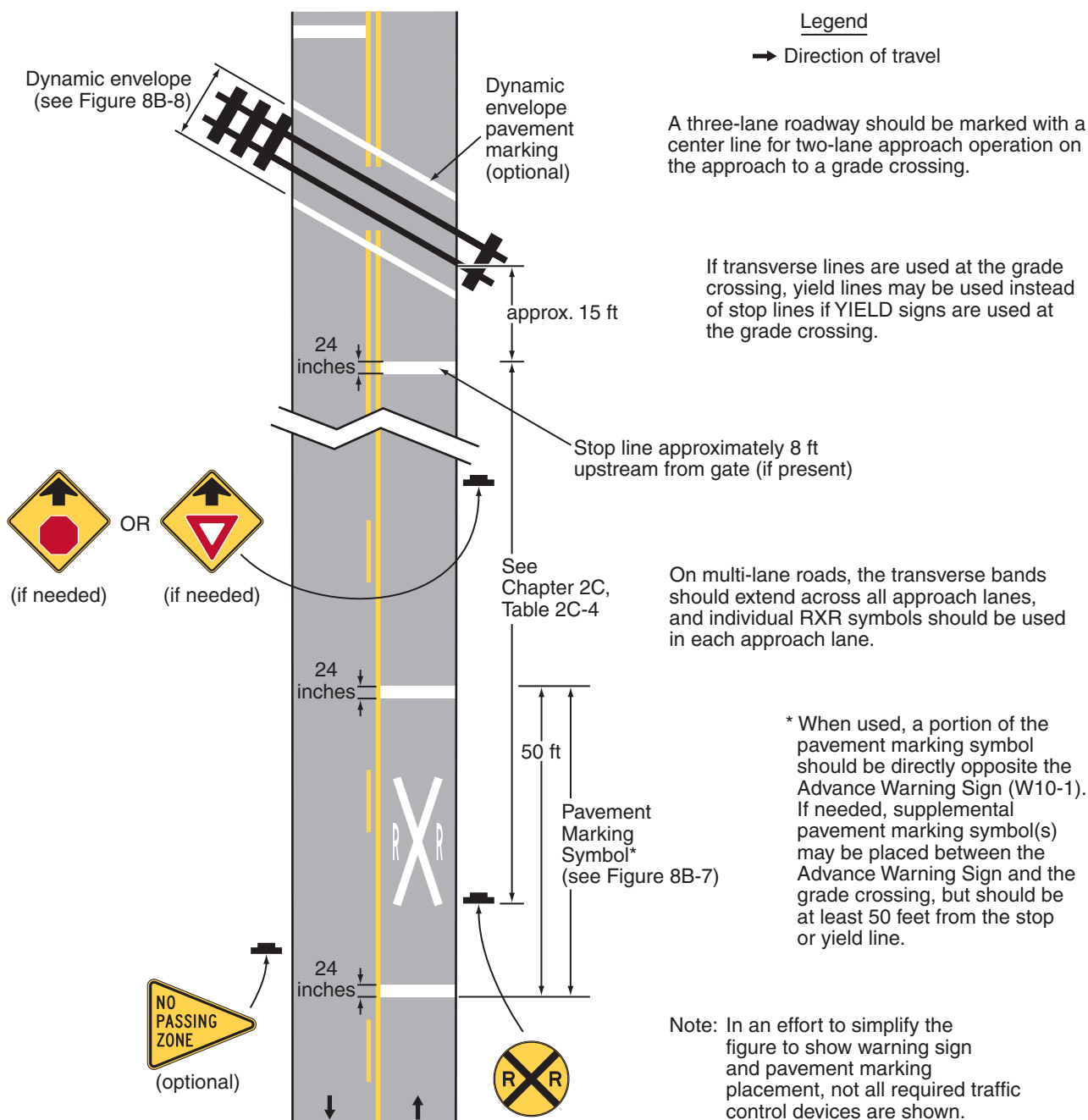
*Professional Engineer in CT, MA, ME, NH, RI and VA*

JSD/jsd

Attachments

cc: File

**Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Grade Crossings**



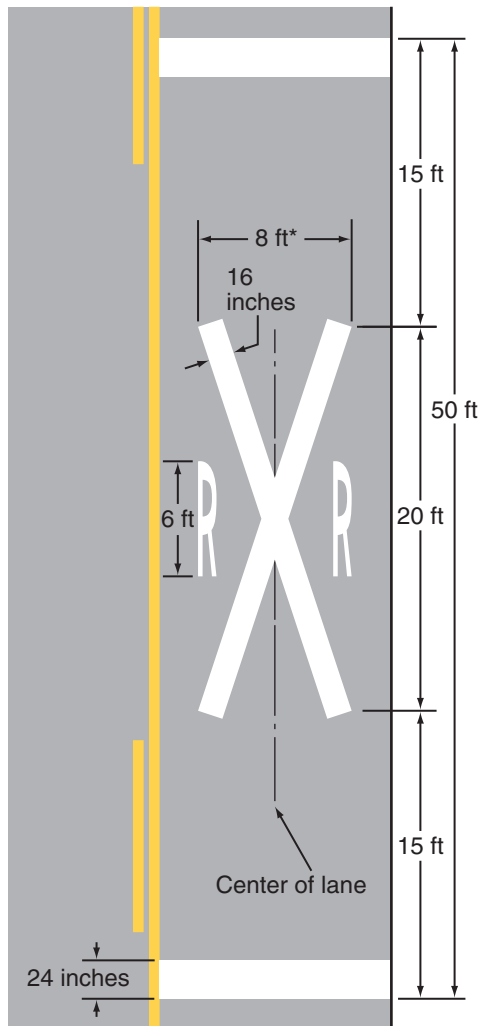
**warning and control. Pavement markings shall not be required at grade crossings in urban areas if an engineering study indicates that other installed devices provide suitable warning and control.**

*Guidance:*

- 05 When pavement markings are used, a portion of the X symbol should be directly opposite the Grade Crossing Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

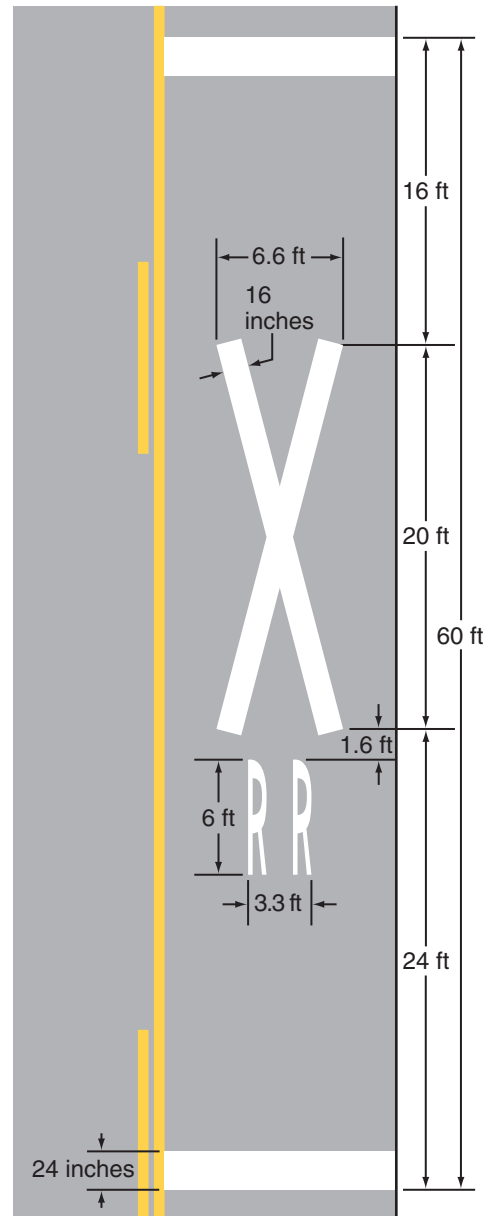
*Option:*

- 06 When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed between the Grade Crossing Advance Warning sign and the grade crossing.

**Figure 8B-7. Grade Crossing Pavement Markings****A - Grade crossing pavement marking symbol**

\*Width may vary according to lane width

Note: Refer to Figure 8B-6 for placement

**B - Grade crossing alternative (narrow) pavement marking symbol**

## Section 8B.28 Stop and Yield Lines

### Standard:

- 01 On paved roadways at grade crossings that are equipped with active control devices such as flashing-light signals, gates, or traffic control signals, a stop line (see Section 3B.16) shall be installed to indicate the point behind which highway vehicles are or might be required to stop.

### Guidance:

- 02 On paved roadway approaches to passive grade crossings where a STOP sign is installed in conjunction with the Crossbuck sign, a stop line should be installed to indicate the point behind which highway vehicles are required to stop or as near to that point as practical.
- 03 If a stop line is used, it should be a transverse line at a right angle to the traveled way and should be placed approximately 8 feet in advance of the gate (if present), but no closer than 15 feet in advance of the nearest rail.