WYOMING DEPARTMENT OF TRANSPORTATION

ROAD DESIGN MEMORANDUM #7

DATE OF ISSUE: May 1, 2023

Approved by: Christina Spindler
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Issued by: Project Development, WYDOT, Cheyenne

GENERAL TOPIC: ROAD DESIGN STANDARDS
SUBJECT: 4-LANE NON-INTERSTATE HIGHWAYS

General

The following standard layouts have been established for the conversion of existing 2-lane roadways to 4-lane roadways on the proposed four-lane corridors. Each 4-lane corridor will need to be evaluated to determine the appropriate section along its length. It should be anticipated that the typical section may vary along the corridor.

In addition, each corridor should be evaluated to determine if two new roadways should be constructed or if the existing roadway should be used for one direction of the 4-lane roadway. From an economic standpoint, the preferred option is to use the existing 2-lane roadway for one direction of the future 4-lane roadway.

Typical Sections

76-foot Divided Median: This layout (exhibit sheets 1, 2 & 6) is proposed for non-restricted terrain and right-of-way corridors. It is the preferred layout and is based on being able to store and u-turn a WB-65 vehicle on the median crossovers.

56-Foot Divided Median: This layout (exhibit sheets 3, 4 & 6) is proposed for partially restricted terrain or problem right-of-way locations. The median width is based on being able to store a large school bus in the median.

12-Foot Paved Median: This layout is proposed (exhibit sheet 5) for difficult terrain or very restricted right-of-way locations where there is a potential for left turn movements either now or in the future.

8-Foot Paved Median: This layout (exhibit sheet 5) is proposed for difficult terrain or very restricted right-of-way locations where there is no potential for left turn movements either now or in the future.

Discussion on Crown

Establishing a strict policy to govern every situation is not recommended, at least until more experience is gained with the design, construction, operation and maintenance of these 4-lane facilities. General guidelines for use in considering each situation should prove more useful in the near term. There may be considerations of median width which favor one method, or the other. As these emerge, they need to be documented.

There would seem to be some logic which favors keeping both lanes the same. As these routes tend to be the "goods and services/recreational" routes internal to the state, many of the users will traverse in both directions frequently. So, keeping both lanes the same will not violate driver expectancy. Snow removal, and some other maintenance operations may also benefit from having both lanes the same.

Following this logic, it is recommended that, where an existing center crown highway will function as one lane of a multilane facility, both lanes employ a center crown.

The location of the crown on the existing center crown highway may need to shift to provide the requisite 4-foot left, and 8-foot right shoulders. If this roadway is being overlaid, the crown should be shifted using milling and/or leveling. If no pavement work is proposed under the initial project, and one or both shoulders will be of deficient width, a design exception should be processed, and should indicate that the crown will be shifted, and/or the roadway will be widened on a future project when pavement conditions require surfacing work.

Where both lanes of a multilane facility will be new construction, it is recommended that both lanes employ a shoulder crown. This would seem to simplify the transition from an undivided, multilane section commonly employed in fringe urban areas to the shoulder crown, divided section.

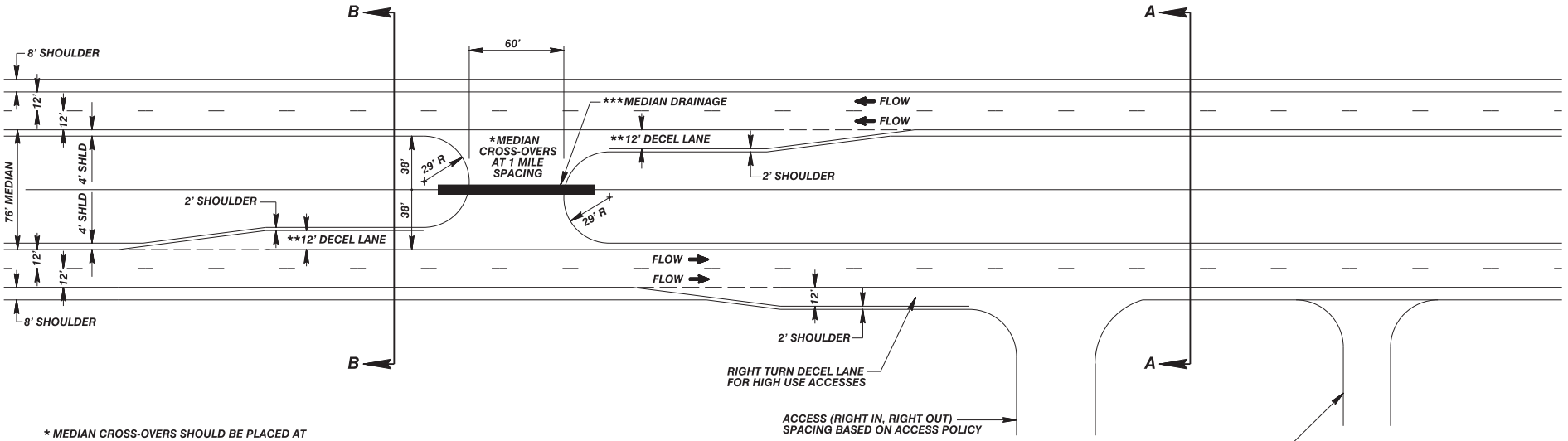
Crossovers should be sloped into the median to facilitate drainage. It is desirable to have the additional roadway widening for acceleration and deceleration lanes on the median side sloped toward the median on a 2% cross slope.

Reference

Operating Policy 7-5 Standards for Non-Interstate Multilane Highways

STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	1	6

FOUR LANE ROADWAYS
NON-RESTRICTED TERRAIN LOCATIONS
(76' MEDIAN WIDTH)



* MEDIAN CROSS-OVERS SHOULD BE PLACED AT ALL MAJOR ROADS AND ANY SIGNIFICANT GENERATORS OF TRUCK TRAFFIC.

** THE LENGTH OF TAPERS AND DECEL/STORAGE LANES SHOWN HERE ARE PORTRAYED SHORTER THAN THEY REALLY ARE. USE STANDARD LENGTH TAPERS AND DECEL/STORAGE LANES AS DETERMINED BY THE TRAFFIC PROGRAM.

*** USE CULVERTS AND/OR MEDIAN DRAINS AS NECESSARY TO PROVIDE PROPER DRAINAGE. ENSURE DRAINAGE FEATURES AND CROSSOVER SIDE SLOPES ARE TRAVERSABLE BY ERRANT VEHICLES. PROVIDE ADEQUATE CROSS-SLOPE ON CROSSOVERS TO PREVENT PONDING AND POTENTIAL ICING.

THE MEDIAN MAY NEED TO BE WIDENED TO AT LEAST 90' AT MAJOR INTERSECTIONS (STATE HIGHWAYS, MAJOR COUNTY ROADS, ETC.) TO ACCOMODATE WB-65 STORAGE IN MEDIAN AND VEHICLE TURNING MOVEMENTS.

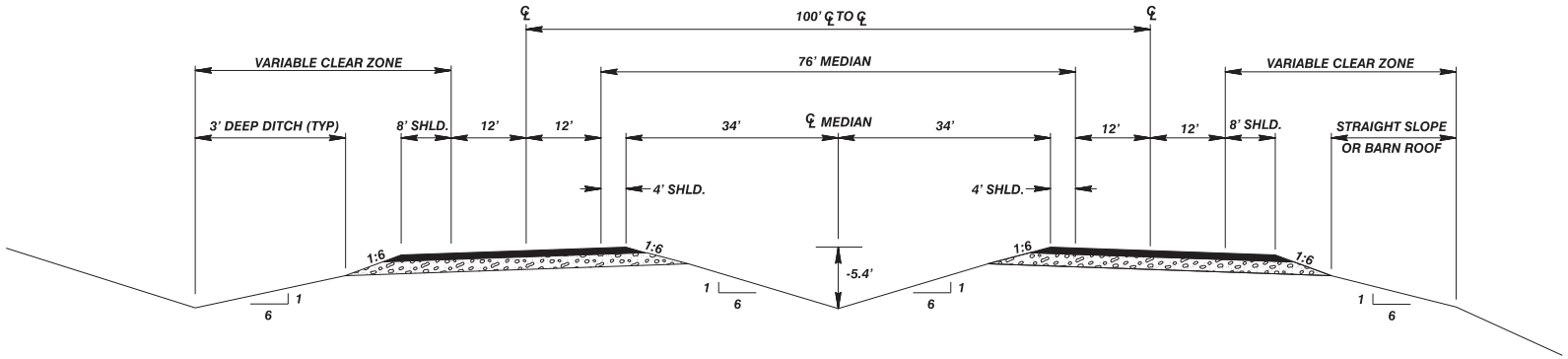
APPROXIMATE RIGHT-OF-WAY WIDTHS

REGULAR 2-LANE	200'
8' MEDIAN	232'
56' MEDIAN	280'
76' MEDIAN	300'

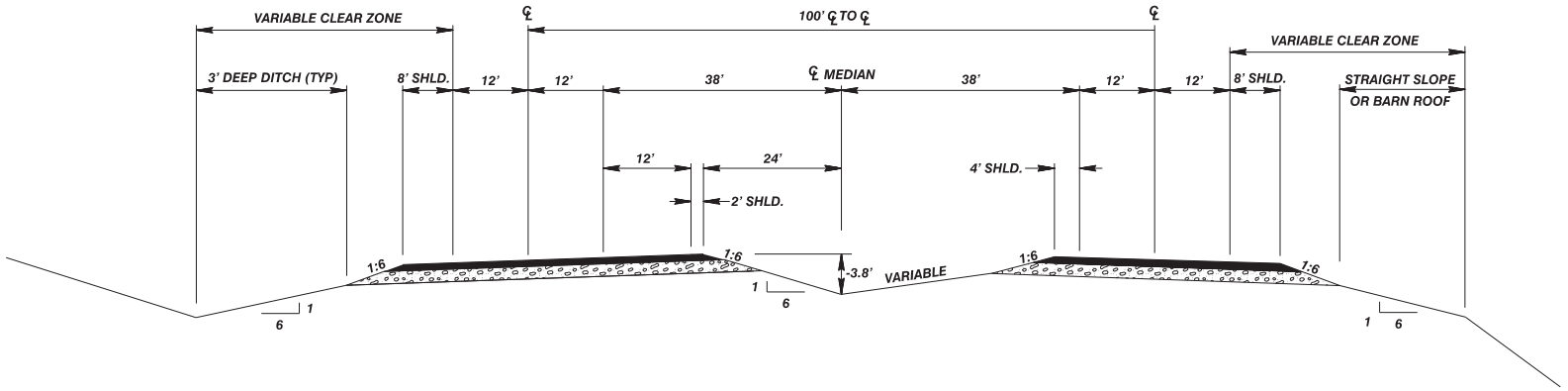
STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	2	6

FOUR LANE ROADWAYS
NON-RESTRICTED TERRAIN LOCATIONS
(76' MEDIAN WIDTH)
TYPICAL SECTIONS

SECTION A-A



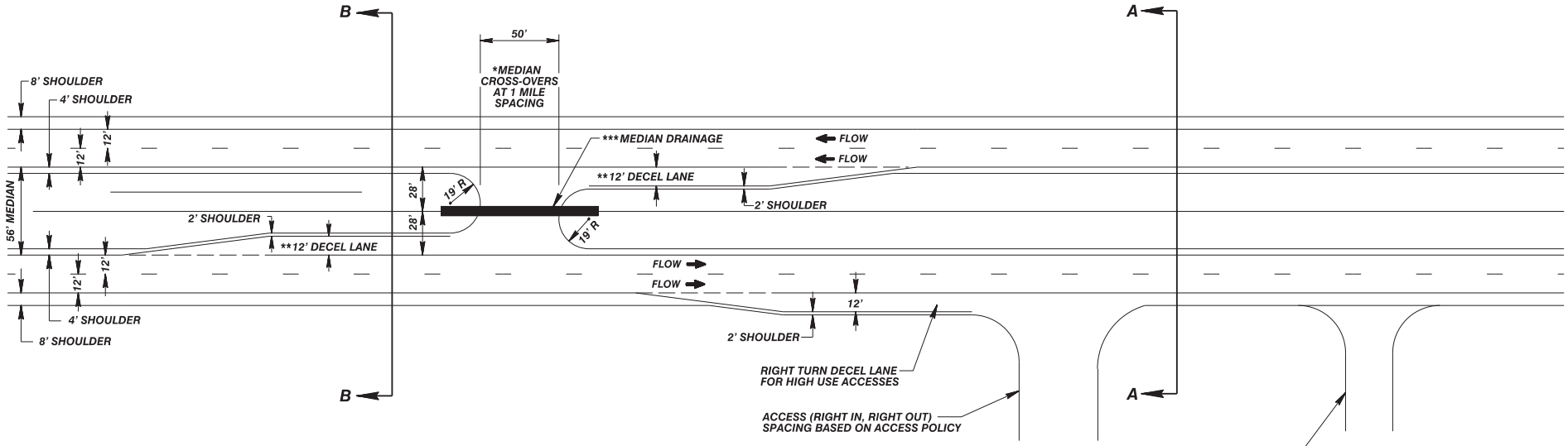
SECTION B-B



NOTE: SURFACING TAPERS WILL BE IN ACCORDANCE WITH THE WYDOT DESIGN GUIDES.

STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	3	6

FOUR LANE ROADWAYS
PARTIALLY RESTRICTED TERRAIN LOCATIONS
(MINIMUM FOR DIVIDED SECTIONS)
(56' MEDIAN WIDTH)



* MEDIAN CROSS-OVERS SHOULD BE PLACED AT ALL MAJOR ROADS AND ANY SIGNIFICANT GENERATORS OF TRUCK TRAFFIC.

** THE LENGTH OF TAPERS AND DECEL/STORAGE LANES SHOWN HERE ARE PORTRAYED SHORTER THAN THEY REALLY ARE. USE STANDARD LENGTH TAPERS AND DECEL/STORAGE LANES AS DETERMINED BY THE TRAFFIC PROGRAM.

*** USE CULVERTS AND/OR MEDIAN DRAINS AS NECESSARY TO PROVIDE PROPER DRAINAGE. ENSURE DRAINAGE FEATURES AND CROSSOVER SIDE SLOPES ARE TRAVERSABLE BY ERRANT VEHICLES. PROVIDE ADEQUATE CROSS-SLOPE ON CROSSOVERS TO PREVENT PONDING AND POTENTIAL ICING.

A MINIMUM MEDIUM WIDTH OF 56' IS NEEDED TO ALLOW A SCHOOL BUS TO STORE IN THE MEDIAN AND THEN MAKE A U-TURN. A TYPICAL LARGE SCHOOL BUS (84 PASSENGERS) IS 40' LONG.

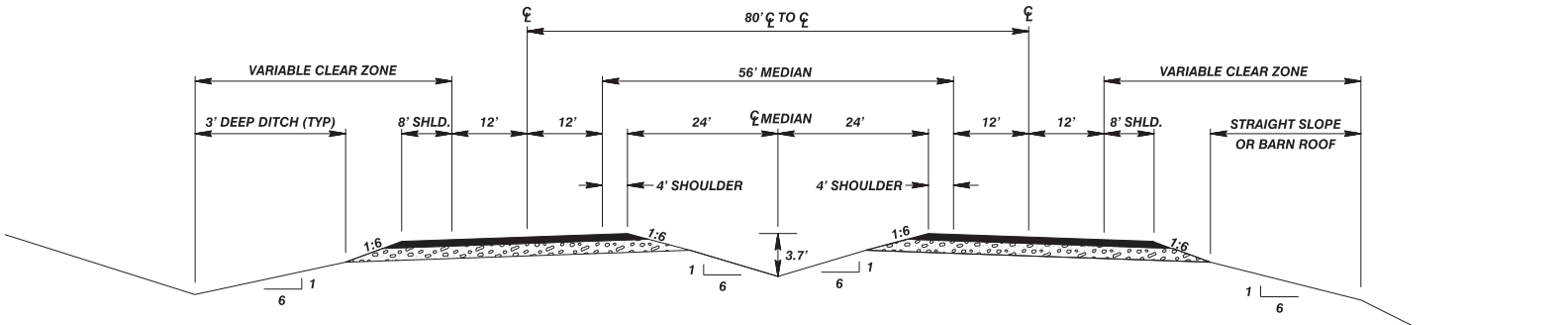
APPROXIMATE RIGHT-OF-WAY WIDTHS

REGULAR 2-LANE	200'
8' MEDIAN	232'
56' MEDIAN	280'
76' MEDIAN	300'

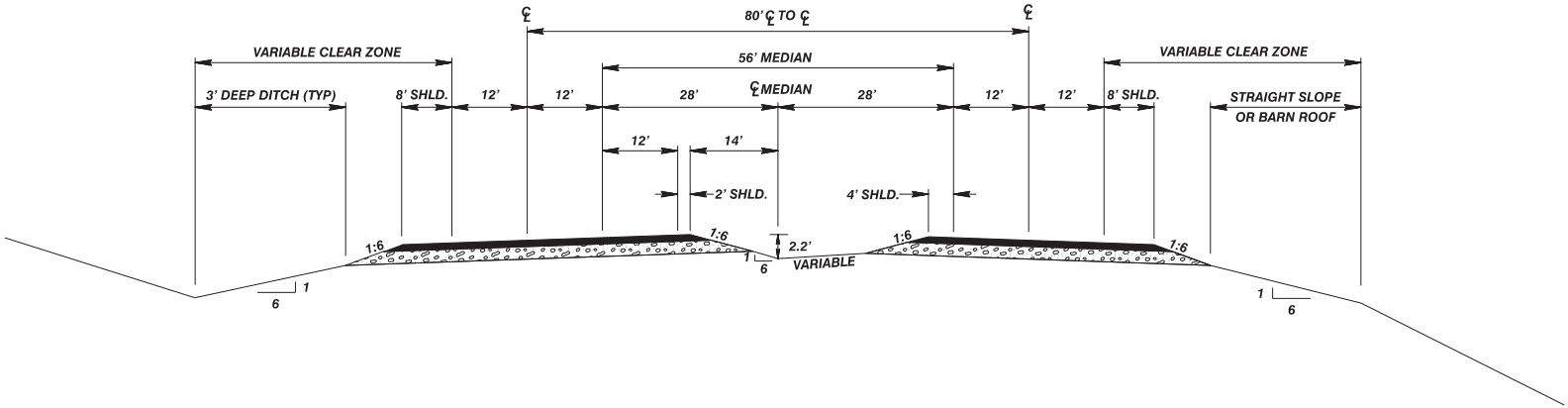
STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	4	6

FOUR LANE ROADWAYS
PARTIALLY RESTRICTED TERRAIN LOCATIONS
(56' MEDIAN WIDTH)
TYPICAL SECTIONS

SECTION A-A



SECTION B-B



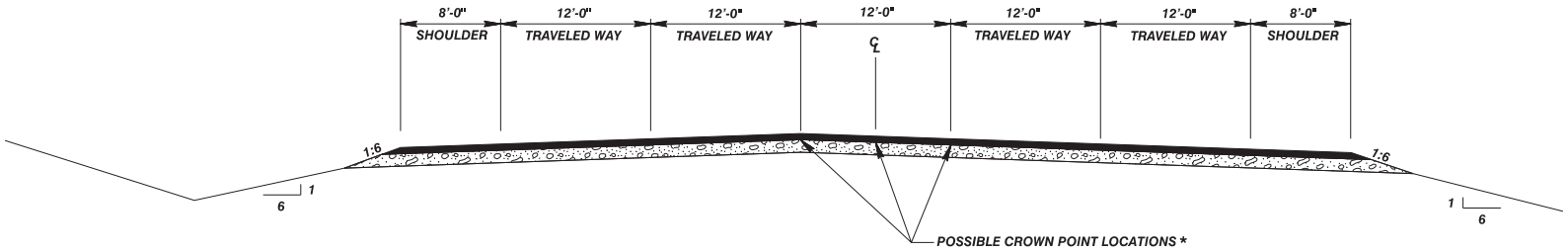
NOTE: SURFACING TAPERS WILL BE IN ACCORDANCE WITH THE WYDOT DESIGN GUIDES.

STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	5	6

FOUR LANE ROADWAYS

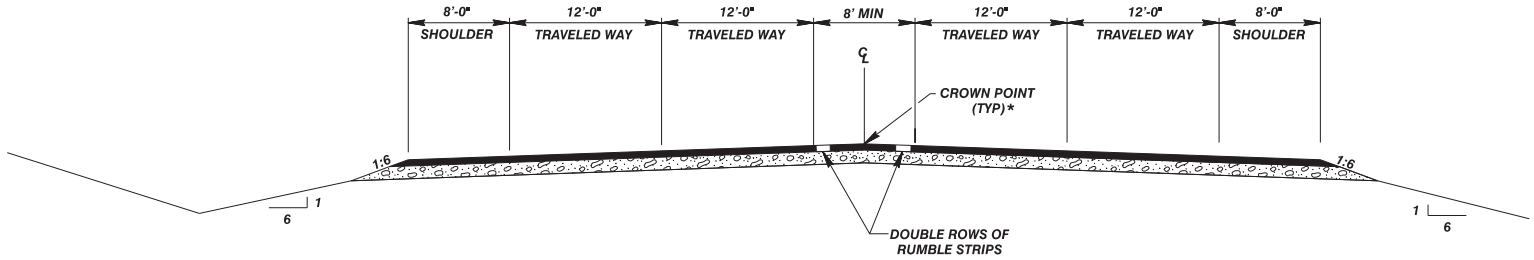
TYPICAL SECTION

5-LANE SECTION IN DIFFICULT TERRAIN
OR RESTRICTED R/W WITH NEED FOR LEFT TURN MOVEMENTS



TYPICAL SECTION

4-LANE SECTION IN DIFFICULT TERRAIN
AREAS OR RESTRICTED R/W WITH NO NEED FOR LEFT TURN MOVEMENTS

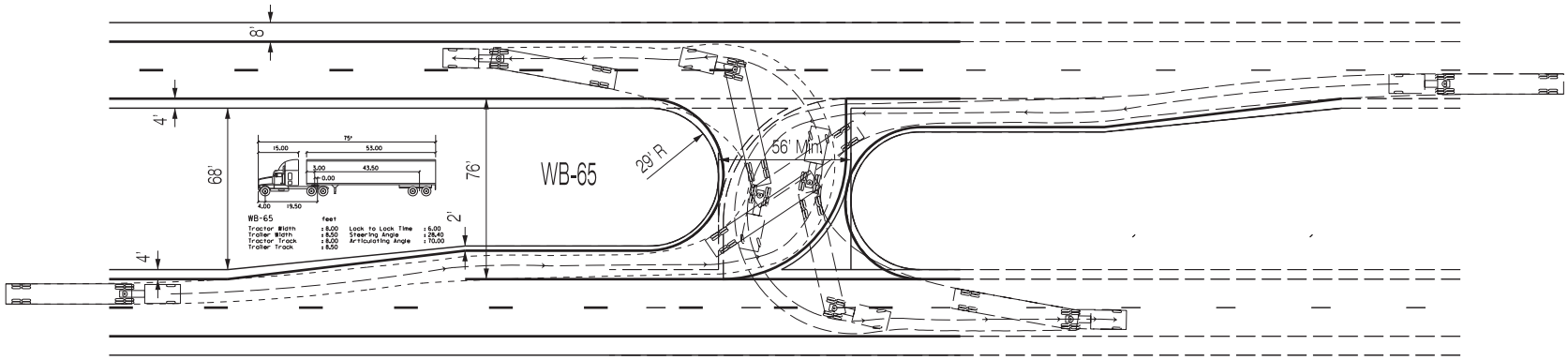


* THE LOCATIONS OF THE CROWN POINT WILL BE DETERMINED DURING THE DESIGN PHASE. CONSIDERATION SHOULD BE GIVEN TO SNOW REMOVAL METHODS, MEDIAN BARRIER PLACEMENT, AND TRANSITIONS BETWEEN THE DIVIDED AND UN-DIVIDED HIGHWAY SECTIONS.

NOTE: SURFACING TAPERS WILL BE IN ACCORDANCE WITH THE WYDOT DESIGN GUIDES.

STATE OF WYOMING	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	·	6	6

76' MEDIAN



The drawings on this sheet are for reference only. They illustrate how the median widths were originally analyzed. Any further analysis should be done using the actual geometry of a given roadway segment, the appropriate design vehicle and re-running AutoTurn for the speed being analyzed.

56' MEDIAN