

El Paso/Santa Teresa – Chihuahua Border Master Plan



Appendix E Criteria Definition and Scoring Metric



El Paso/Santa Teresa – Chihuahua Border Master Plan

Criteria Scoring Metrics



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Capacity / Congestion Category

Road and Interchange Projects

1. Final Level of Service (LOS)

Level of Service (LOS) is a measure of the level of congestion experienced on different segments of transportation infrastructure. Typically, LOS of E or F is considered congested, while a LOS of A to D is considered acceptable. The higher the final LOS, the higher the score assigned. The road and interchange projects will be scored as follows:

Final LOS	Score
F and E	0.00
D	0.25
C	0.50
B	0.75
A	1.00

2. Increase in Level of Service (LOS)

An improvement (increase) in LOS measures a decrease in congestion experienced. The higher the improvement in LOS achieved (e.g., from LOS F to LOS A or B), the higher the score assigned. The road and interchange projects will be scored as follows:

		To LOS					
		F	E	D	C	B	A
From LOS	F	0	0.25	0.5	0.75	1	1
	E		0	0.25	0.50	0.75	1
	D			0	0.25	0.50	0.75
	C				0	0.25	0.5
	B					0	0.25
	A						0

3. Congestion Management

The Congestion Management criterion assesses the decrease in congestion experienced resulting from the implementation of non-traditional infrastructure measures, such as non-motorized transportation routes, HOV lanes, ITS, and mass transit corridors. The more non-traditional infrastructure measures associated with the planned road and interchange project, the higher the score assigned. The road and interchange projects will be scored as follows:



Congestion Management Measures	Score
No measure	0.00
Non-motorized mobility route	0.25
HOV lanes	0.50
ITS (e.g., information to users, screens, tracking systems, RFID, security devices, alternate routes, travel information)	0.75
Mass transit corridor (e.g., bus lane, light rail, passenger rail)	1.00

Rail Projects

1. Increase in Track Capacity

This criterion assesses the increase in track capacity resulting from a planned rail project. A distinction is made to reflect whether capacity is added to rail track or rail yards. Increase in rail track capacity can be achieved from, for example, an increase in the number of rail tracks, the relocation of rail track to increase efficiency or capacity, geometric improvements that allow higher train speeds, or a change in the type of tracks to allow for the movement of heavier trains (e.g., track can accommodate 130 ton rail cars as opposed to 110 tons). The higher the increase in rail track capacity, the higher the planned rail track project will be scored. Increase in track capacity at rail yards will be measured in terms of the increase in the number of rail cars (i.e., increased rail car capacity) resulting from a planned rail project. The higher the increase in rail car capacity associated with a planned rail project, the higher the score assigned to the planned rail project.

Rail Track Projects will be scored as follows:

Increase in Track Capacity	Score
No change	0.00
Improvement	0.25
Add track in <i>current</i> location	0.50
Bypass / relocation	0.75
New location / new rail	1.00

Rail Yard Projects will be scored as follows:

Increase in Rail Car Capacity	Score
No increase	0.00
Up to an additional 110 rail cars (equivalent to one long track)	0.50
More than 110 additional rail cars	1.00

2. Alleviate Congestion Locally

The Alleviate Congestion Locally criterion measures how a given rail project will affect vehicle (i.e., road) traffic congestion within the same county (US) or municipality (Mx). Alleviate local congestion is a function of the number of at-grade rail crossings eliminated by the proposed rail project. The higher the number of rail crossings eliminated, the higher the assigned score. Rail projects will be scored as follows:



Number of At-grade Rail Crossings Eliminated	Score
None	0.00
1 to 5	0.50
More than 5	1.00

3. Increase in Rail Mode Share

The Increase in Rail Mode Share criterion measures how many truck loads will be diverted from congested streets to rail by a proposed rail project that adds rail infrastructure capacity. It is estimated that one rail car equates to three truck loads. The higher the number of daily truck loads diverted to rail as a result of the proposed rail project, the higher the assigned score. Rail projects will be scored as follows:

Number of Daily Truck Loads Diverted to Rail	Score
None	0.00
Divert up to 300 daily trucks from congested streets to rail	0.33
Divert between 301 daily trucks and 500 daily trucks from congested streets to rail	0.67
Divert more than 500 daily trucks from congested streets to rail	1.00

Port-of-Entry (POE) Projects

1. Increase in Number of Operational Booths (Lanes/Rail Tracks)

An increase in the number of fully operational lanes/rail tracks is a measure of added POE capacity. In the case of new POE projects, the final number of fully operational lanes/rail tracks equals the increase in the number of fully operational lanes/rail tracks. The higher the number of added fully operational lanes, the higher the added POE capacity. POE projects will be scored as follows:

Increase in Number of Lanes/Rail Tracks	Score
No change	0.00
Double-stacked booth	0.15
+1	0.33
+2	0.67
+3 or more	1.00

* Double stacked booths and new lanes can be additive.

2. Increase Number of Secure Lanes

Secure lanes (i.e., specialized lanes such as, FAST or SENTRI lanes, Remote Logistics Tracking, and Driver Less Cargo Movement Systems) increase the throughput of different modes - thereby enhancing the capacity of the POE. POE projects will be scored as follows:

Number of Secure Lanes	Score
No increase in secure lanes	0.00
READY and or Specialized Bus Lanes	0.50
Advanced lane technology (FAST, SENTRI, Remote Logistics Tracking, Driver Less Cargo Movement Systems)	1.00



3. Decrease Wait Times

Wait times is as a measure of POE congestion and can be expressed as a weighted average wait time given the different modes (i.e., vehicles, commercial vehicles, and pedestrians) handled by a POE. The POE projects will be scored given the POE wait times by mode and the weight assigned to each mode as follows:

		Score			
Mode Weight	Mode	0.25	0.50	0.75	1.00
1/3	Pedestrians	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
1/3	Automobiles	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
1/3	Trucks	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile

* Please refer to Appendix 1 for the definition of quartile.

4. Alleviates Congestion

The Alleviate Congestion criterion measures how a planned POE project will affect congestion. A 2011 baseline would be established by calculating the average regional waiting time. The expected wait times as a result of the proposed/planned project for existing crossings and new crossings will also be calculated. The criterion will be measured as the ratio between the expected wait times relative to the regional waiting times (i.e., baseline). The POE projects will be scored as follows:

Expected Wait Time Relative to the Baseline (from highest to lowest)	Score
No Impact	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

5. Increase POE Efficiency through a Congestion Management Strategy

The Congestion Management Strategy criterion assesses the increase in POE efficiency resulting from the implementation of non-traditional infrastructure investments, such as traffic management strategies, signing, ITS, remote logistics tracking systems, and driver-less cargo movement systems. The more sophisticated the congestion management strategy/the higher the increase in POE efficiency associated with the planned POE project, the higher the score assigned. The POE projects will be scored as follows:

Congestion Management Strategy/ Improved Efficiency	Score
No improvement	0.00
Traffic management strategies / signing	0.25
ITS	0.50
Remote logistics tracking	0.75
Driver-less cargo movement system	1.00



Demand Category

Road and Interchange Projects

1. Increase in Average Annual Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) is a measure of travel demand or usage of a facility and is calculated by dividing the total annual vehicle traffic by 365 days. An increase in the AADT is a measure of the demand satisfied or additional usage of the facility. In the case of new road or interchange projects, the final AADT equals the increase in AADT. The increase in AADT will be calculated as the difference between the expected AADT in 2030 and the current AADT (should use data obtained after 2004/2005). The higher the increase in AADT, the higher the demand satisfied or additional usage of the facility. The road and interchange projects will be scored as follows:

Increase in AADT	Score
No change	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

2. Existing Percentage of Trucks

The percentage of trucks is the share of the AADT that are trucks and is an indicator of the importance of the road or interchange to goods movement. The higher the percentage of trucks, the higher the importance of the road or interchange to goods movement. The road and interchange projects will be scored as follows:

Percentage of Trucks	Score
None	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

3. Multiple Mode Demand

The Multiple Mode Demand criterion measures the number of additional modes facilitated by a proposed road and interchange project. The higher the additional modes facilitated, the higher the score assigned. The road and interchange projects will be scored as follows:



Number of Additional Modes	Score
No additional modes	0.00
1 additional mode	0.33
2 additional modes	0.67
3 or more additional modes	1.00

Rail Projects

1. Increase in Average Annual Daily Rail Cars (AADRC)

Average Annual Daily Rail Cars is a measure of rail demand or usage of a rail facility and is calculated by dividing the total annual number of rail cars by 365 days. An increase in the Average Annual Daily Rail Cars (AADRC) is a measure of the demand satisfied or additional usage of the rail facility. In the case of new rail projects, the final AADRC equals the increase in AADRC. The increase in AADRC will be calculated as the difference between the expected AADRC in 2030 and the current AADRC (should use data obtained after 2004/2005). The higher the change in AADRC, the higher the demand satisfied or additional usage of the facility. The rail projects will be scored as follows:

Increase in AADRC	Score
No increase	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

2. Cross-border tonnage by rail

This criterion measures the current total tonnage of goods moved by rail across the border and is an indicator of the importance of the rail infrastructure to cross-border goods movement. The higher the total tonnage moved by rail across the border, the higher the score assigned. The rail projects will be scored as follows:

Current Cross-Border Tonnage by Rail	Score
No data	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

3. Multiple Mode Demand

The planned rail projects will receive a score considering the expressed public demand for an additional mode facilitated by the proposed project. The higher the expressed public demand for an additional mode, the higher the score assigned. The rail projects will be scored as follows:



Additional Modes	Score
No	0.00
Yes	1.00

The project sponsor will need to document and describe in detail to the study team the level of expressed public demand for additional modes and how it materialized or was expressed.

Port-of-Entry Projects

1. Increase in Average Annual Daily Non-Commercial Crossings

Annual Average Daily Non-Commercial Crossings (i.e., vehicles, pedestrians, and buses) is a measure of travel demand or usage of the POE and is calculated by dividing the total Annual Non-commercial Crossings by 365 days. An increase in the Annual Average Daily Non-Commercial Crossings is a measure of the demand satisfied or additional usage of the POE. The relative increase in the Annual Average Daily Non-Commercial Crossings for new crossings will be calculated as the ratio between the expected Annual Average Daily Non-Commercial Crossings in 2030 and the 2011 total number of Non-Commercial crossings. The relative increase in the Average Annual Daily Non-Commercial Crossings for existing crossings will be calculated as the ratio between the additional crossings in 2030 and the 2011 total number of Non-Commercial crossings. The planned POE projects will be scored as follows:

Relative Increase in Average Annual Daily Non-Commercial Crossings	Score
No increase	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

2. Increase in Average Annual Daily Commercial Crossings

Average Annual Daily Commercial Crossings (i.e., commercial vehicles only) is a measure of travel demand or usage of the POE and is calculated by dividing the total Annual Commercial Crossings by 365 days. An increase in the Average Annual Daily Commercial Crossings is a measure of the demand satisfied or additional usage of the POE. The relative increase in the Average Annual Daily Commercial Crossings for new crossings will be calculated as the ratio between the expected Average Annual Daily Commercial Crossings in 2030 and the 2011 total number of Commercial crossings. The relative increase in the Average Annual Daily Commercial Crossings for existing crossings will be calculated as the ratio between the additional crossings in 2030 and the 2011 total number of Commercial crossings. The planned POE projects will be scored as follows:



Relative Increase in Average Annual Daily Commercial Crossings	Score
No increase	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

3. Transit Demand

The Transit Demand criterion assesses the demand for cross-border transit services at the POE. The higher the demand, the higher the score assigned to a proposed POE project. The planned POE projects will be scored as follows:

Transit Demand	Score
No demand	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

Economic Value Category

All Projects

1. Socio-Economic Impacts

The socio-economic impacts criterion is a qualitative assessment of the socio-economic impacts of a proposed project in terms of employment creation, increased property value, the distribution of traffic flows or any other relevant measure. The project sponsor will need to document and describe in detail to the study team the socio-economic impacts of the proposed project. The projects will be scored as follows:

Socio-Economic Impacts	Score
No/Negative Impact	0.00
Low Positive Impact	0.33
Medium Positive Impact	0.67
High Positive Impact	1.00

2. Cost Effectiveness (\$/Capacity Criterion)

The cost effectiveness criterion is defined as the public cost (i.e., project cost – private participation, \$) of the project per lane-mile (for roads and interchanges), per track-mile (for rail projects), and per number of fully operational booths (for POE projects). The higher the cost effectiveness (i.e., lower the value), the higher the score assigned. Projects will be scored as follows:



\$/Capacity	Score
Zero	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

3. Cost Effectiveness (\$/Demand Criterion)

The cost effectiveness criterion is defined as the public cost (i.e., project cost – private participation, \$) of the project divided by the change in AADT (for roads and interchanges), by the change in AADRC (for rail projects), and by the change in the number of fully operational booths (for POE projects). The higher the cost effectiveness (i.e., lower the value), the higher the score assigned. Projects will be scored as follows:

\$/Demand	Score
Zero	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

Project Readiness Category

All Projects

1. Funding Availability

Secured project funding can be considered a measure of project readiness. A planned project that has secured funding for a relatively high percentage of the total project budget is more likely to be completed and should therefore be assigned a higher score. The projects will be scored as follows:

Funding Secured as % of Project Budget	Score
10% or less	0.00
11 – 25%	0.25
26 – 50%	0.50
51 – 75%	0.75
More than 75%	1.00

2. Phase of Project Development

There are a number of phases in project development. A traditional phased approach involves a sequence of steps to be completed. Typical phases include: (i) conceptual, (ii) preliminary feasibility (includes cost of project, acreage, etc.), (iii) planning/programming, (iv) all environmental permits acquired (Local/State/Federal), (v) more than 80% of ROW acquired and Local/State/Federal permits obtained, and



(vi) project is ready to be let. This is thus another measure of project readiness. A higher score will be assigned to projects that have reached certain levels of maturity as opposed to those that are in the conceptual phase. The projects will be scored as follows:

Phase of Project Development	Score
Conceptual	0.00
Preliminary feasibility	0.20
Planning/Programming	0.40
All environmental permits acquired (Local/State/Federal)	0.60
>80% ROW acquired, Local/State/Federal Permits obtained, stakeholder commitment/agreement	0.80
Project is ready to be let	1.00

Safety Category

Road and Interchange and Rail Projects

1. Accident Rate per Mile

The Annual Accident Rate per Mile criterion is a measure of the “level of safety” experienced on a given facility. The higher the Annual Accident Rate per Mile on an existing facility, the higher the need for a project to improve the “level of safety” on the facility and the higher the score assigned. In the case of a new project the Annual Accident Rate per Mile on a parallel and similar road, interchange or rail facility, respectively will be used. The road and interchange and rail projects will be scored as follows:

Annual Accident Rate per Mile	Score
No Data	0.00
1 st Quartile	0.25
2 nd Quartile	0.50
3 rd Quartile	0.75
4 th Quartile	1.00

* Please refer to Appendix 1 for the definition of quartile.

2. Measures to Improve Safety

The Measures to Improve Safety criterion assesses the anticipated improvement in the “level of safety” experienced as a function of the number of safety measures – e.g., geometric improvements, improved lighting and signage, construction of guard rails and safety barriers, installation of crossing gates, installation of rail crossing control infrastructure, and preventative rail maintenance – associated with a proposed project. The more measures associated with the planned road and interchange or rail project, respectively the higher the score assigned. The road and interchange and rail projects will be scored as follows:



Number of Safety Measures	Score
None	0.00
1 or 2	0.50
3 or more	1.00

Port-of-Entry (POE)

1. Diversion of Commercial Traffic / Separation of Traffic by Type

In the case of new POE projects the criterion will measure if commercial traffic is diverted out of urban areas and in the case of existing POEs the criterion will analyze if measures will be taken to have a clear and physical separation by traffic type (i.e., pedestrians, bicycles, POVs, trucks).

New POE projects will be scored as follows:

Diversion of Traffic from Urban Areas	Score
No	0.00
Yes	1.00

Existing POE projects will be scored as follows:

Separation by Traffic Type	Score
No separation	0.00
Separation of 1 mode	0.33
Separation of 2 modes	0.67
Separation of more than 2 modes	1.00

Regional Impacts Category

All Projects

1. Community Impacts

The Community Impacts criterion is a qualitative assessment of the community impacts (i.e., environmental justice and economic activity) associated with a proposed/planned project. The project sponsor will need to document and describe in detail how the proposed project impacts protected communities and the economic characteristics of the area. The projects will be scored as follows:



Community Impacts	Score
None/ Environmental justice communities are disproportionately impacted	0.00
Environmental justice communities are not disproportionately impacted	0.50
Substantial increase in economic activity	0.50
Environmental justice communities are not disproportionately impacted and substantial increase in economic activity	1.00

2. Geographical Impacts

This criterion attempts to measure the wider geographic/spatial impacts – e.g., traffic distribution and congestion impacts – associated with proposed/planned projects. The wider the geographic impact (i.e., local, regional, wider regional, or bi-national), the higher the score assigned.

Wider Geographic Impacts	Score
No impact/Local impact	0.00
Regional impact (up to 60 miles/100 kilometers)	0.33
Wider regional impact (more than 60 miles/100 kilometers)	0.67
Bi-national impact (Mexico and U.S.)	1.00

Bi-national Coordination Category

Port-of-Entry (POE) Projects

1. Bi-national Coordination Criteria

This criterion assesses whether the binational components of a POE project have been taken into account. The extent of bi-national coordination will be assessed by determining whether a given project: 1) has been formally discussed by both governments at the federal level and marked by federal milestones including exchange of official documents; 2) is being coordinated via the Bi-national Bridges and Border Crossings Group (BBBXG), and other fora as appropriate; 3) has been submitted to the U.S. Department of State for a U.S. Government Presidential Permit (or submitted as an application for an amendment of an existing Presidential Permit), and accepted as a complete application; or 4) is included on the twelve-month action plan of the bilateral Executive Steering Committee on 21st Century Border Management. POE projects will be scored as follows:

Measures for Bi-national Coordination	Score
None	0.00
One measure	0.25
Two measures	0.50
Three measures	0.75
Four measures	1.00



Port-of-Entry Connectivity Category

Road, Interchange and Rail Projects

1. Number of POEs Served

This criterion measures how many POEs are served by a proposed project by directly connecting to the POE or by connecting to a POE road/rail track. The higher the number of POEs served (directly or indirectly), the higher the score assigned. The road and interchange and rail projects will be scored as follows:

Number of POEs Served	Score
1	0.33
2	0.67
3 or more	1.00

2. Improve Accessibility/Traffic Flow to and from POE

This criterion measures if a proposed road/interchange or rail project improves access or the flow of traffic to and from a POE. The maximum score will be assigned to a proposed project that improves access/traffic flow to **and** from a POE. The road/interchange or rail projects will be scored as follows:

Improve Accessibility/Traffic Flow	Score
No improvement	0.00
Improve access/traffic flow to POE	0.50
Improve access/traffic flow from POE	0.50
Improve access/traffic flow to and from POE	1.00

3. Degrees of Separation to POE

This criterion measures the degrees of separation between a proposed road/interchange or rail project and the POE. The maximum score will be assigned to a proposed project that directly connects to the POE and lower scores will be assigned if the proposed project indirectly connects/is farther removed from the POE (i.e., one or more nodes removed). The road and interchange and rail projects will be scored as follows:

Degrees of Separation to POE	Score
Direct connection	1.00
Indirect connection - one node removed	0.75
Indirect connection - 2 nodes removed	0.50
Indirect connection - 3 nodes removed	0.25
Indirect connection - 4 or more nodes	0.00



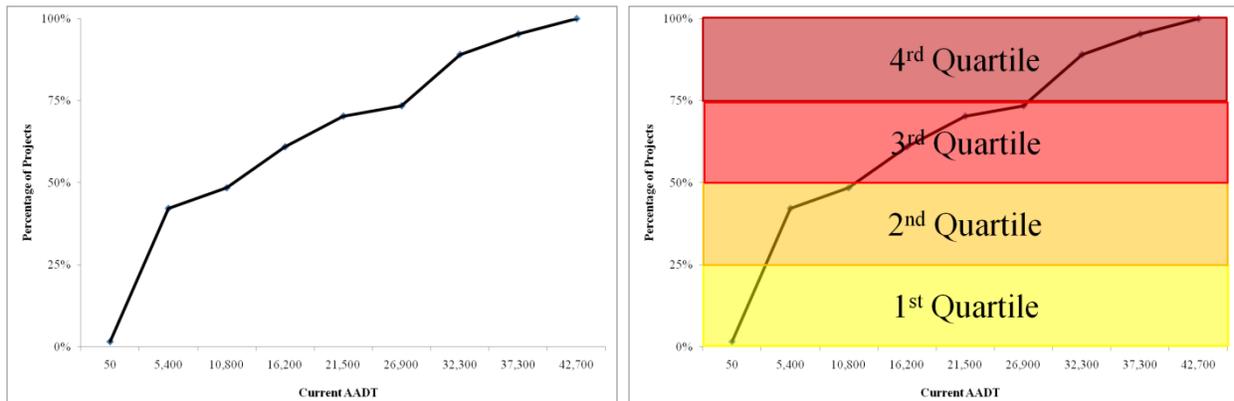
Appendix 1 – Quartiles

A quartile is a statistical term corresponding to one of three points, that divide a ranked data set into equal groups, each representing a fourth of the data points. The three points are:

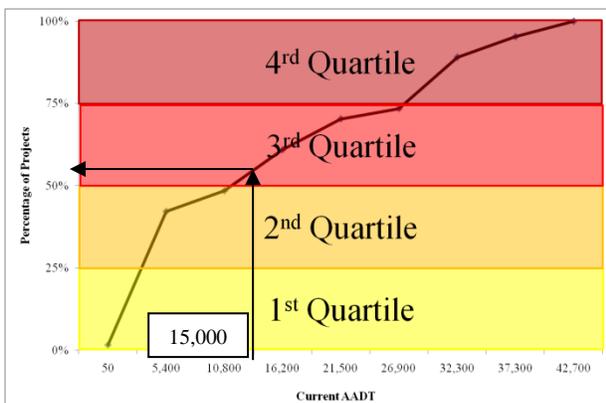
- The 1st Quartile (Q1) or lower quartile is the value in the ranked data set for which 25% of the values are lower and 75% of the values are higher. The Q1 also corresponds to the 25th Percentile.
- The 2nd Quartile (Q2) or median, corresponds to the value in the ranked data set that divides the ranked data in half. The Q2 also corresponds to the 50th Percentile.
- The 3rd Quartile (Q3) or upper quartile is the value in the ranked data set for which 75% of the values are lower and 25% of the values are higher. The Q3 corresponds to the 75th Percentile.

Example – Average Annual Daily Traffic (AADT)

The following figure illustrates the AADT values for 65 projects.



When Q1, Q2, and Q3 are estimated, the data set is divided into 4 sets, corresponding to the data between the 0th and 25th Percentiles, 25th and 50th Percentiles, 50th and 75th Percentiles, and 75th and 100th Percentiles. For the criterion that use quartiles, the projects will be scored depending on which of the four data sets include the project's criteria value. For example, if a project has an AADT of 15,000,





The AADT value will fall within the 3rd data set and consequently a score corresponding to Q3 will be assigned to the proposed project for this criterion.