



See SPOT Run What Happens after the Prioritization Project Submittal Window Closes?

> NCDOT Prioritization Team May 12, 2016



Prioritization 4.0 (P4.0) Timeline

October – November 2015: MPOs, RPOs, and Divisions submit projects

December 2015 – March 2016: SPOT / Prioritization Team score projects

April 2016: P4.0 scores released



P4.0 Scoring

Complex process

Many different NCDOT Business Units involved

Highways	Non-Highways
Congestion Management Unit	Division of Aviation
Project Development and Environmental Analysis Branch (PDEA)	Bicycle and Pedestrian Division
Traffic Safety Unit	Ferry Division
North Carolina Turnpike Authority (NCTA)	Public Transportation Division
TIP Unit	Rail Division
Feasibility Studies Unit	
ITS and Signals Unit	
Transportation Planning Branch (TPB) and Parsons Brinckerhoff	
GIS Unit	
SPOT	

P4.0 Scoring Process

1. SPOT reviewed # of submitted projects for all modes

- Followed up with each MPO, RPO, and Division if # of submittals was greater or less than the maximum allotment to ensure all approved projects were submitted
- 2. Split P4.0 projects into 6 modal spreadsheets

Highway Projects Scoring Process



Transportation

Highway Scoring – Eligible Quantitative Criteria

<u>Criteria</u>

- Congestion (Volume/Capacity + Volume)
- Benefit/Cost (Travel Time Savings + Safety Benefits / Cost to NCDOT)
- Safety Score (Critical Crash Rates, Density, Severity)
- Economic Competitiveness (Jobs, Change County Economy)
- Accessibility / Connectivity (County Economic Indicator, Improve Mobility)
- **Freight** (Truck Volumes, STRAHNet/Future Interstate, Freight Terminals)
- Multimodal (Passenger Terminals)
- Lane Width (Existing Width vs. Standard Width)
- Shoulder Width (Existing Width vs. Standard Width)
- Pavement Score (Pavement Condition Rating)



P4.0 Scoring Process - Highways

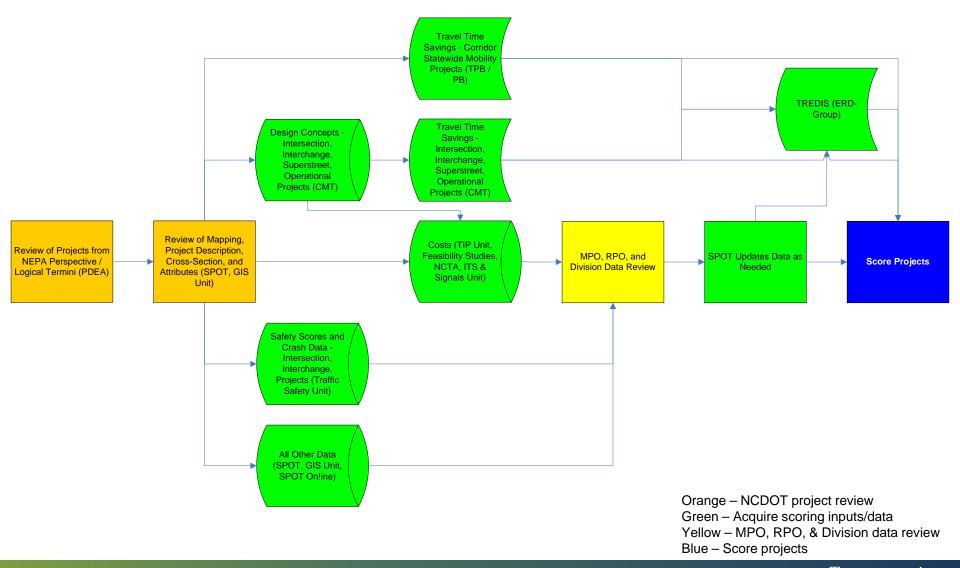
Need to review projects from NEPA perspective (logical termini), for overlaps, mapping, and to ensure project entry inputs are correct

SPOT On!ine provides much of the data used in project scoring

Additional data elements needed

- Proposed design concepts for intersection, interchange, superstreet & operational projects
- Travel time savings for intersection, interchange, superstreet & operational projects
- Travel time savings for corridor projects (Statewide Mobility)
- Safety scores and crash data for intersection and interchange projects
- Project costs

P4.0 Scoring Process - Highways



Transportation

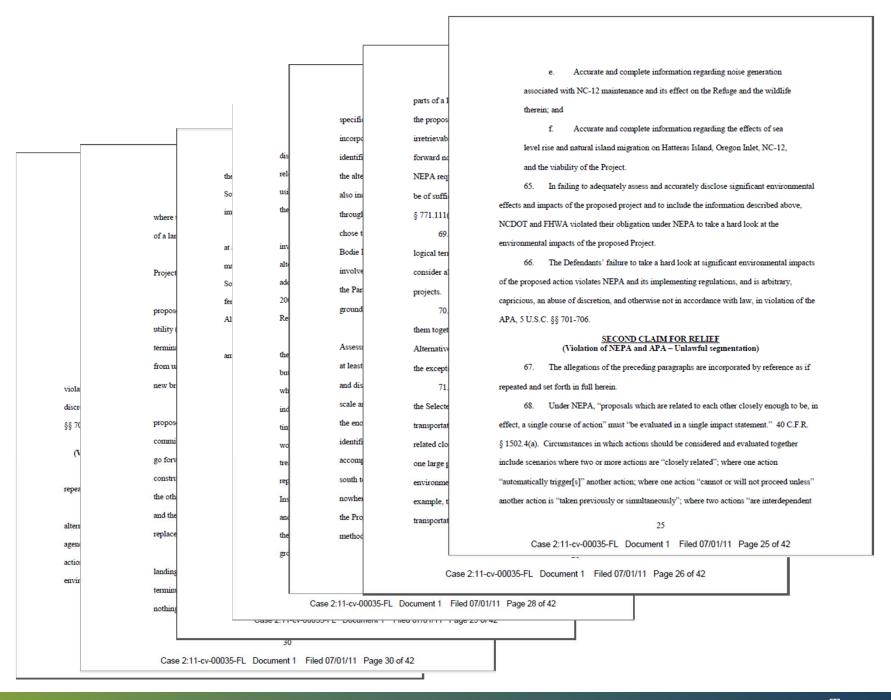
Review of Projects from NEPA Perspective



Transportation

Review of Projects from NEPA Perspective

Purpose – To perform cursory review of the submitted projects with a NEPA lens, primarily focusing on logical termini or any other red flags you see that might cause issues if/when the project reaches the project development stage





FHWA > HEP > Environment > Toolkit Hor

Home	Planning and Environment	NEPA and Project Development	Accelerating Project Delivery	Historic Preservation	Section 4(f)	Water, Wetlands, and Wildlife
NEPA and P	roject Developme	ent				
Program Overvie						
NEPA Implemen		A and Transportation	on Decisionmakir	ng		
NEPA and Trans	portation The	Development of Logical I	Project Termini			
Decisionmaking		ber 5, 1993				
Purpose and Ne	eed I. Intr	oduction				
Alternatives Impacts Mitigation Interagency Co Public Involvem	ordination other in satisfyi	eloping a project concept which can to consider a "whole" or integrated acity improvements, and should be infrastructure improvements in the a ng the need or by causing unexpec a transportation need extends throu	project. This project should sat considered in the context of the rea. Without framing a project i ted side effects which require a	isfy an identified need, su e local area socioeconom in this way, proposed imp additional corrective action	ich as safety, rehabilitation ics and topography, the fu rovements may miss the r n. A problem of "segmenta	n, economic development, iture travel demand, and mark by only peripherally ation" may also occur

https://www.environment.fhwa.dot.gov/projdev/tdmtermini.asp

Interim Guidance on the
Application of Travel and
Land Use Forecasting in
NEPA

Bridge Case Study

Safety and NEPA

Active & Inactive Environmental Impact Statements



action evaluated in each environmental impact statement (EIS) or finding of no significant impact (FONSI) shall:

- - Connect logical termini and be of sufficient length to address environmental matters on a broad scope;
 Have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation
 - 2. Have independent duity of independent significance, i.e., be usable and be a reasonable expenditure even in no additional transport improvements in the area are made; and
 - 3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

The aim of this paper is to discuss criteria that can be used to select logical termini (project limits) for development of a project. The primary discussion will be on the first of the three factors mentioned above. However, all three are interrelated and necessary to the development of an integrated project.

The remainder of this paper is divided into three sections. Section II will further define logical termini. Section III will discuss several case studies covering factors that can come into play in choosing termini, and Section IV will offer some conclusions.

II. A Definition of Logical Termini

Logical termini for project development are defined as (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts. The environmental impact review frequently covers a broader geographic area than the strict limits of the transportation improvements. In the past, the most common termini have been points of major traffic generation, especially intersecting roadways. This is due to the fact that in most cases traffic generators determine the size and type of facility being proposed. However, there are also cases where the project improvement is not primarily related to congestion due to traffic generators, and the choice of termini based on these generators may not be appropriate. The next section will show some examples where this is the case.

Logical Termini

What is your project scope?

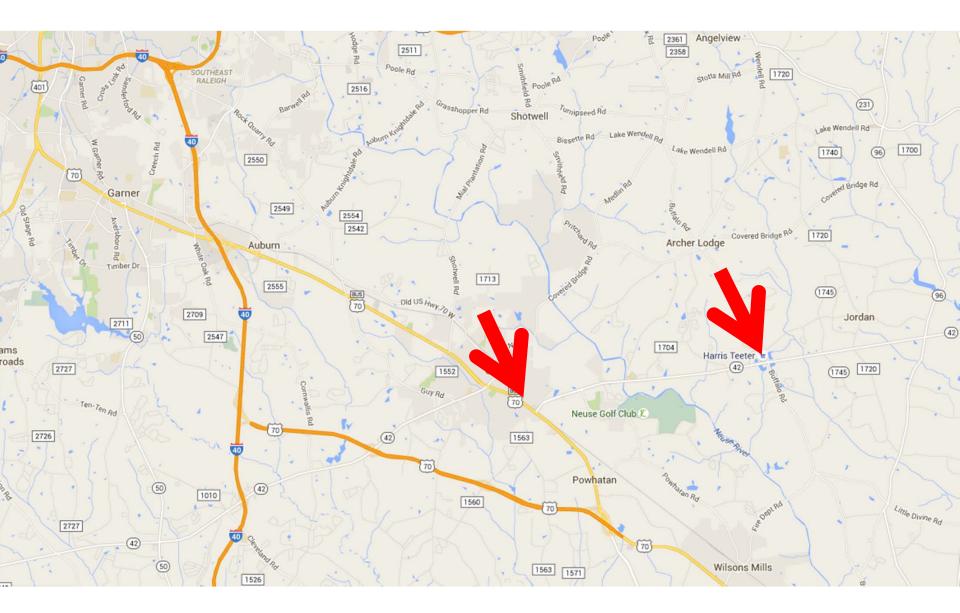
- Widening
- Safety

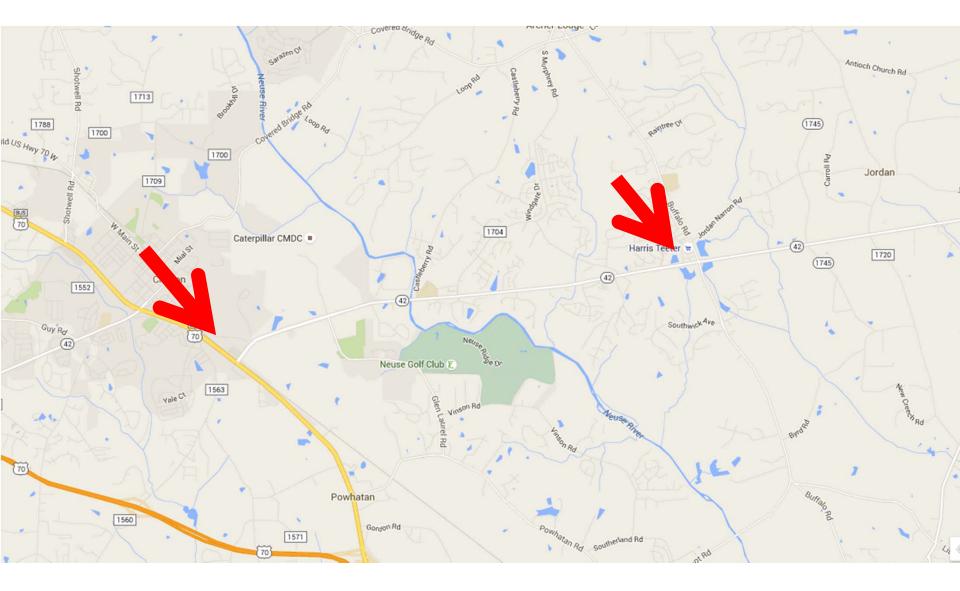
Logical Termini

What is your project scope?

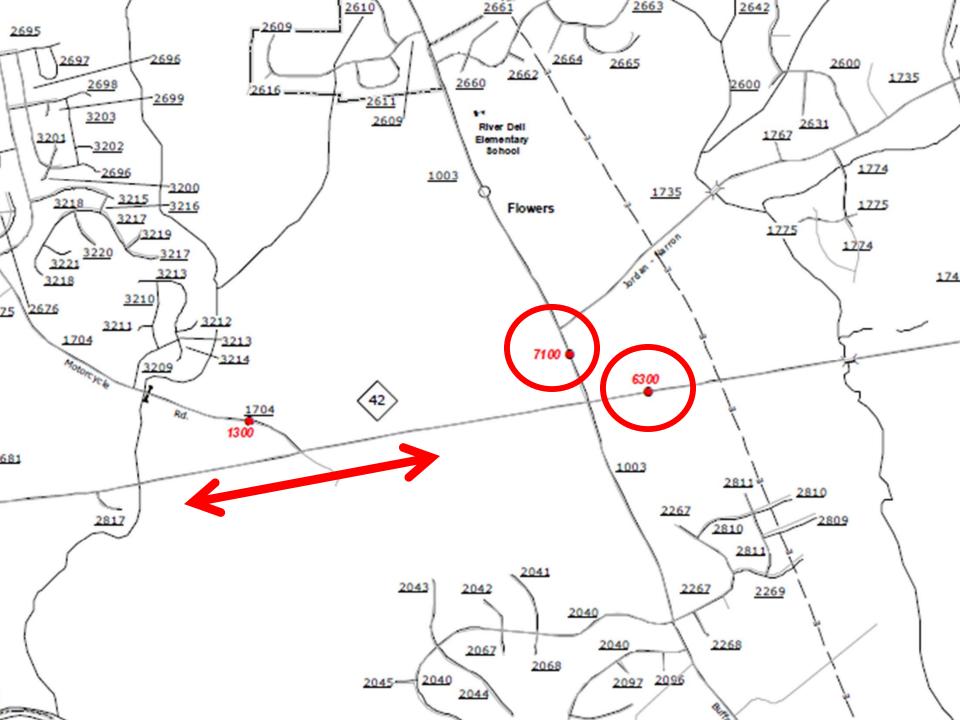
• Widening

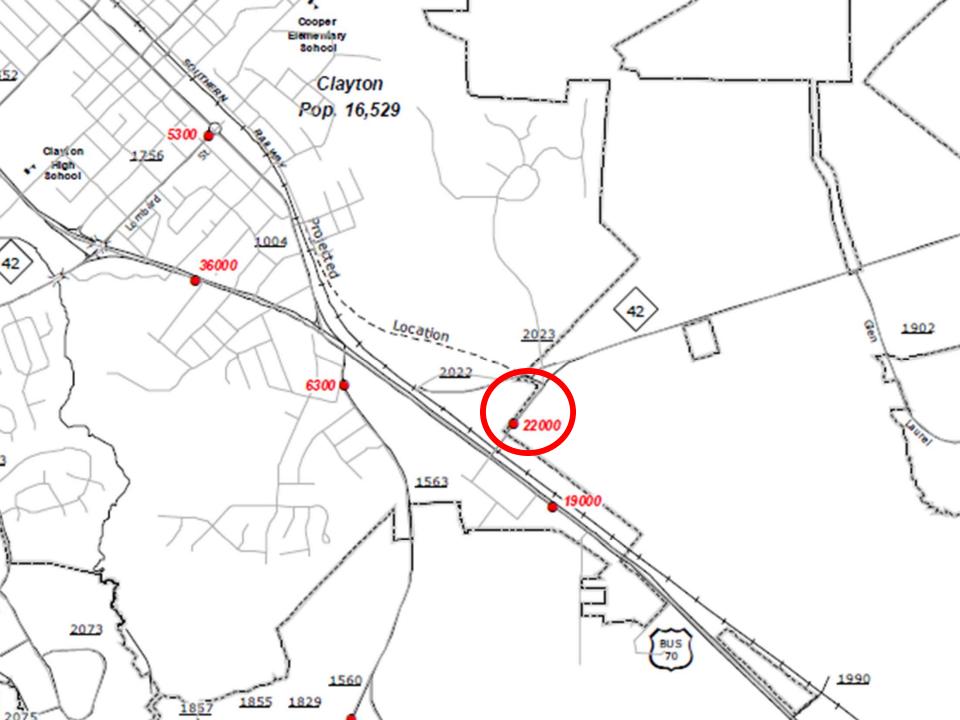
- Major Intersection
- Traffic split

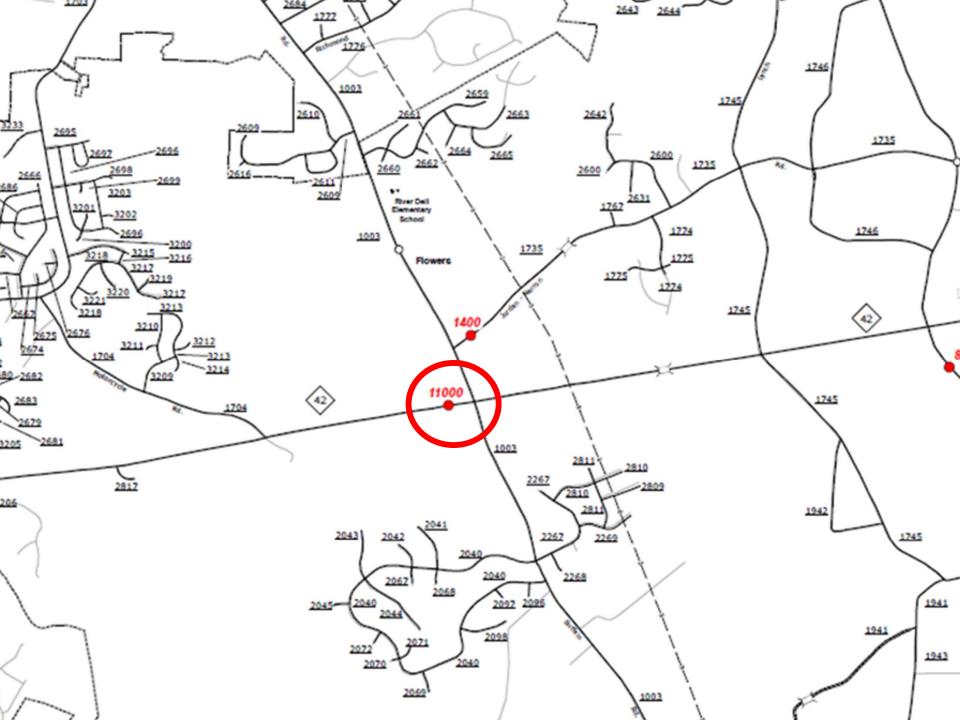


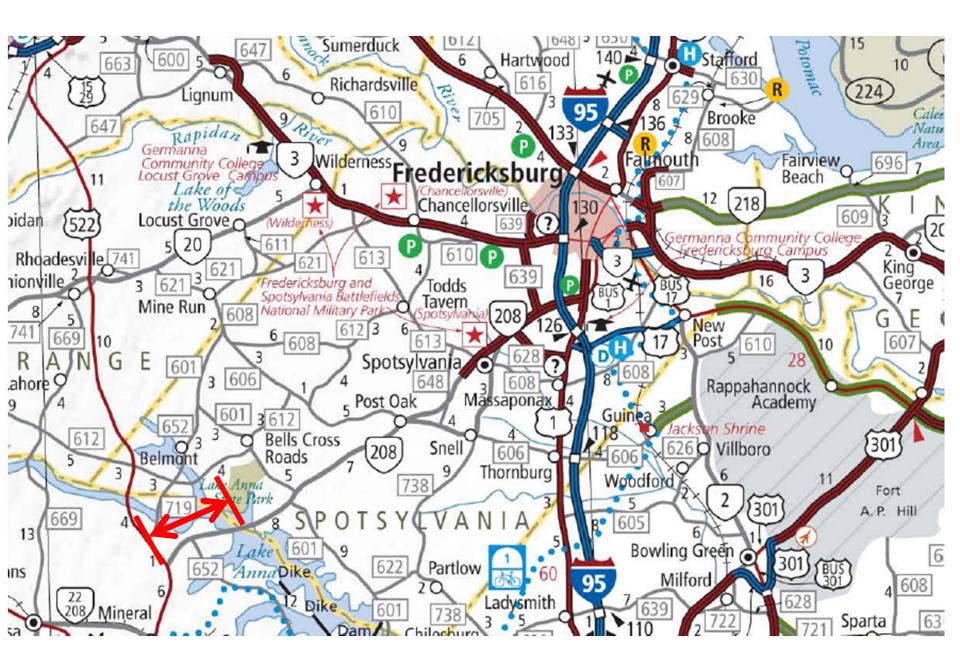


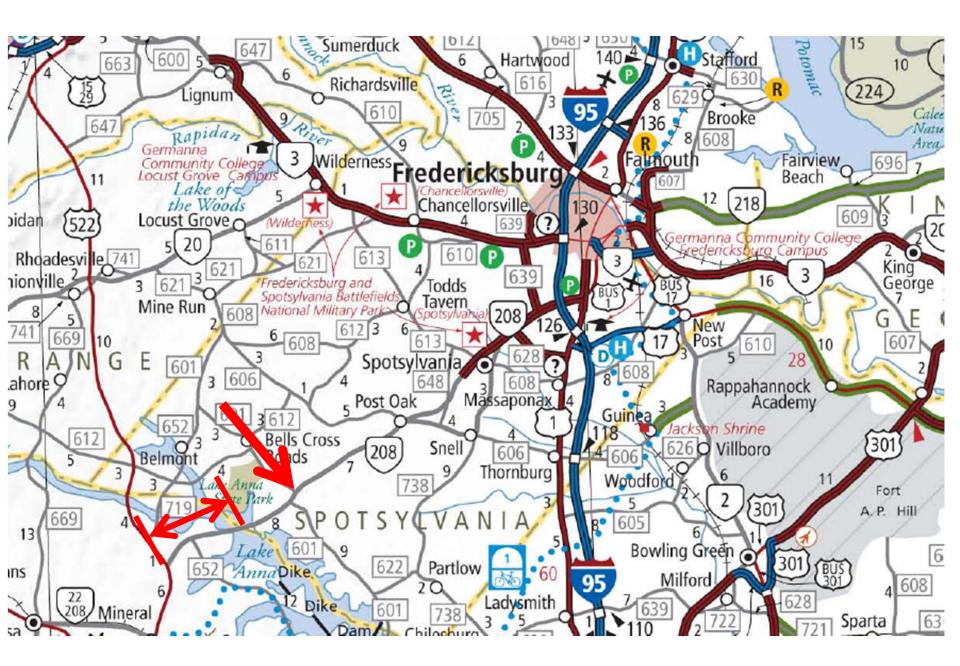


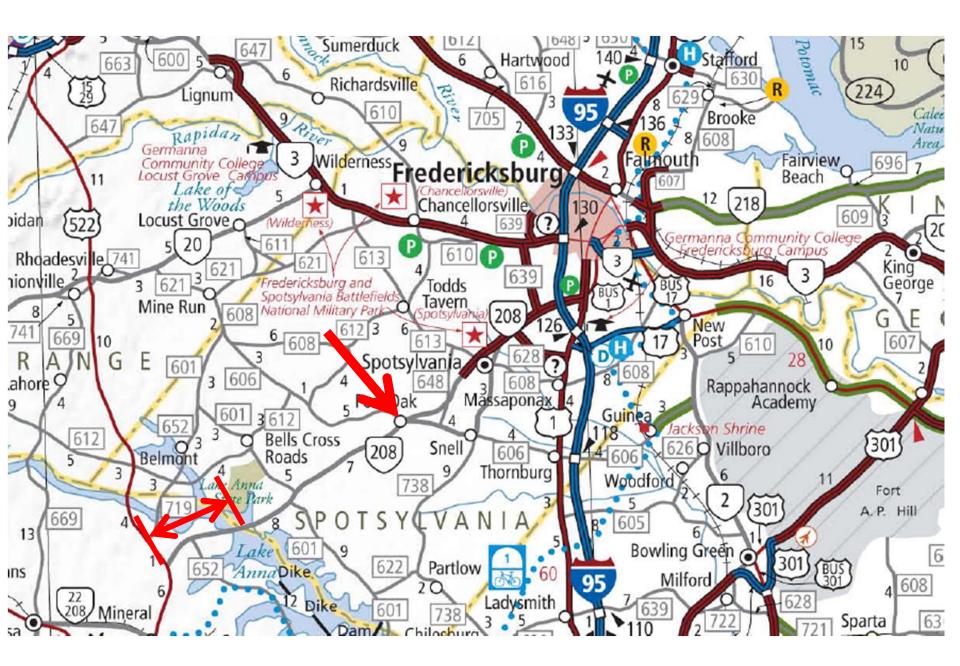


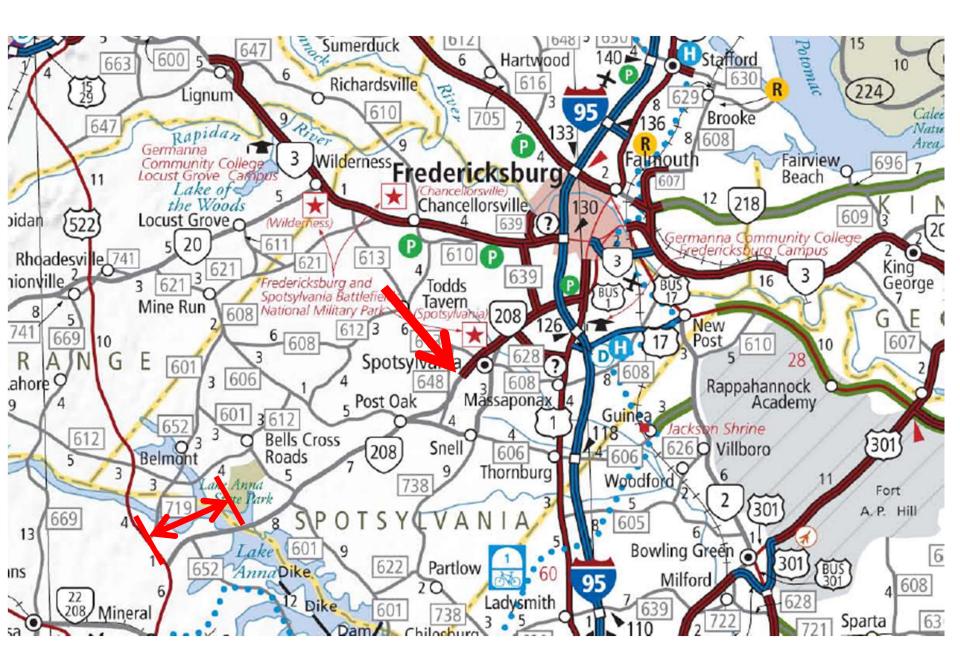


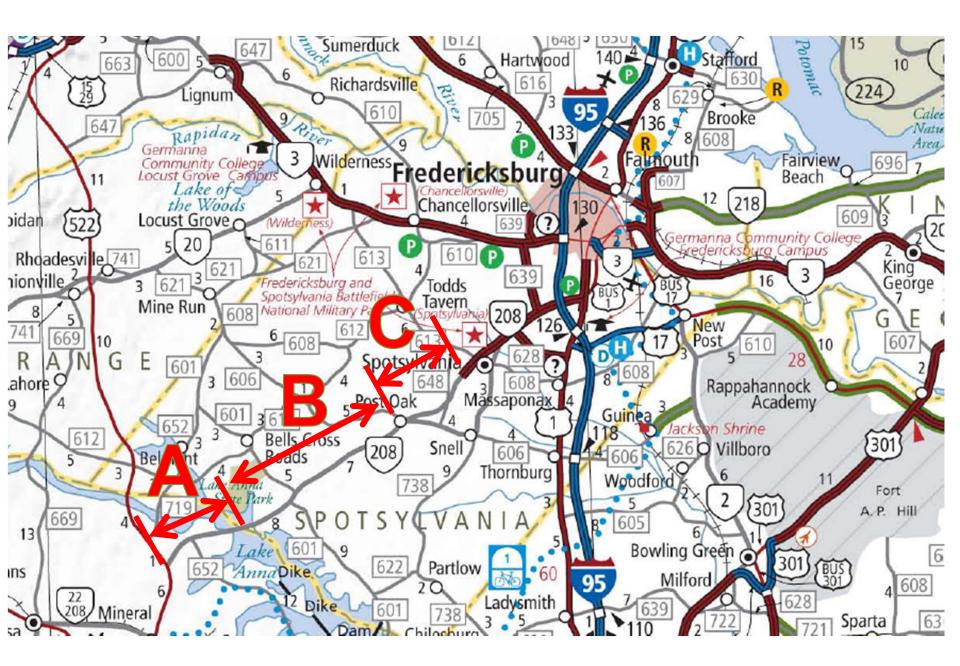


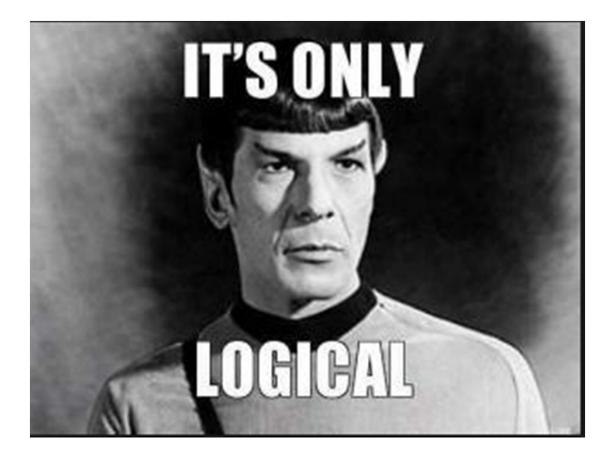












Review of Project Mapping, Descriptions & Attributes

SPOT and GIS Unit thoroughly reviewed the following for each project:

Mapping to ensure it matches project description, including projects on local roadways

Proposed cross-section to ensure it matches project description

Overlapping projects

Parallel routes for all new location projects

Project attributes to ensure they are correct (such as STI category, facility type, functional classification, etc)

Updated/corrected data as needed: future interstate designations (FAST Act), shoulder width

Travel Time Savings for Intersection, Interchange, Superstreet, and Operational Projects (Congestion Management Team)



Intersection, Interchange, Superstreet, and Operational Projects STI Project Prioritization History

- P3.0 Initial Project Analysis Scope (Fall 2013):
 - STI prioritization ~ 65 intersection and interchange projects throughout the state expected
 - TransModeler identified for this project
 - Travel time savings (TTS) scored & used to prioritize projects
- Final project completion (Spring 2014):
 - STI prioritization 285 projects analyzed
 - Biggest challenge traffic volume data

Intersection, Interchange, Superstreet and Operational Projects STI Project Prioritization History

- P4.0 (July 2015 February 2016)
 - July 2015-September 2015 Automatically updated TTS for certain P3.0 projects based on various criteria (86 projects)
 - September 2015 New intersection/interchange projects submitted in advance of November deadline to allow time for analysis
 - October 2015-February 2016 Develop TTS for new projects submitted
 - Included Superstreet projects not included in P3.0

- Alternative Development
 - Provided by submitting agency or "Request the Congestion Management Team to recommend an appropriate concept based on their expertise"
 - Team reviewed each project individually
 - If improvement concept was provided, it was analyzed unless problems were identified (operational issues, constructability, etc.)
 - If no concept was submitted, team developed concept using high tech methods...

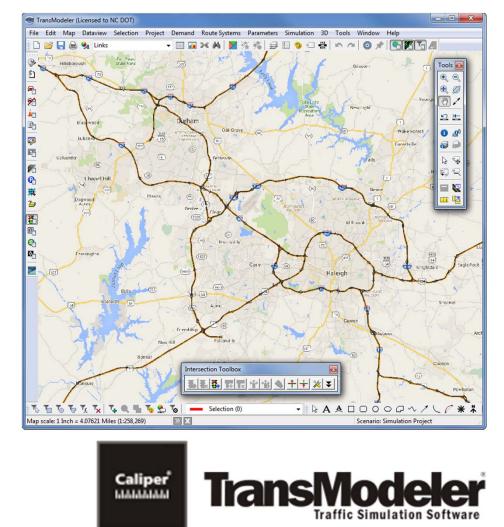
• Alternative Development Methodology

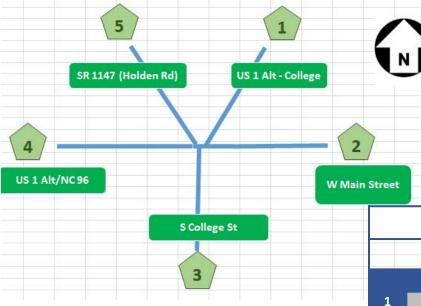


- Travel Time Savings based on ten year project span (2015-2025)
 - Eight models run 2015 and 2025, No-Build and Build, AM and PM
- Volume Development
 - Existing volumes (turning movement percentages) obtained from various sources, primarily traffic counts
 - >200 New Traffic Counts ordered
 - Movement patterns adjusted based on current AADT volumes
 - 2025 volumes developed from growth rates obtained from the Statewide Travel Demand Model

TransModeler Overview

- Traffic simulation software used for a wide array of traffic planning and modeling tasks
- Developed by Caliper Corporation
 - TransModeler 1.1 released October 23, 2006
 - Latest is TransModeler 4.0
- Can simulate many networks from freeways to downtown areas (including multimodal uses)
- GIS-based (data management, layers)
- 2D & 3D, ITS, managed lanes, etc.
- Integrates TransCAD travel demand modeling software





O-D matrixes developed for use in TransModeler

2015								
AM Peak O-D Matrix								
	1 2 3 4 5 Total							
1	0	252	0	67	36	355		
2	313	0	0	72	406	791		
3	0	9	0	0	0	9		
4	32	102	0	0	6	140		
5	6	259	0	13	0	278		
Total	351	622	0	152	448	1573		

2025							
AM Peak O-D Matrix							
	1 2 3 4 5 Tota						
1	0	303	0	81	43	427	
2	342	0	0	79	443	864	
3	0	13	0	0	0	13	
4	47	149	0	0	9	205	
5	7	291	0	14	0	312	
Total	396	756	0	174	495	1821	

PM Peak O-D Matrix

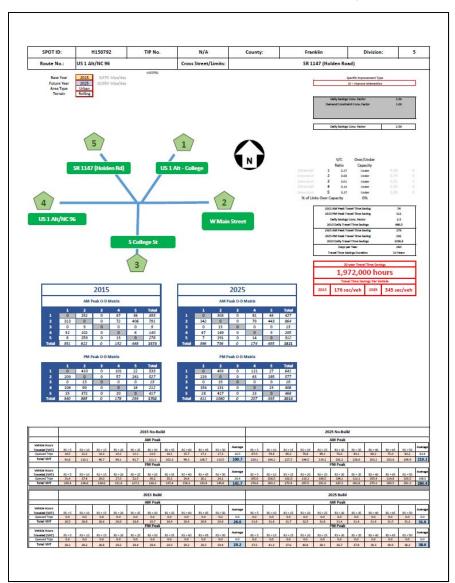
	1	2	3	4	5	Total
1	0	410	0	101	22	533
2	209	0	0	57	261	527
3	0	13	0	0	0	13
4	106	90	0	0	16	212
5	25	372	0	20	0	417
Total	340	885	0	178	299	1702

PM Peak O-D Matrix

	1	2	3	4	5	Total
1	0	493	0	121	27	641
2	229	0	0	63	285	577
3	0	19	0	0	0	19
4	154	131	0	0	23	308
5	28	417	0	23	0	468
Total	411	1060	0	207	335	2013

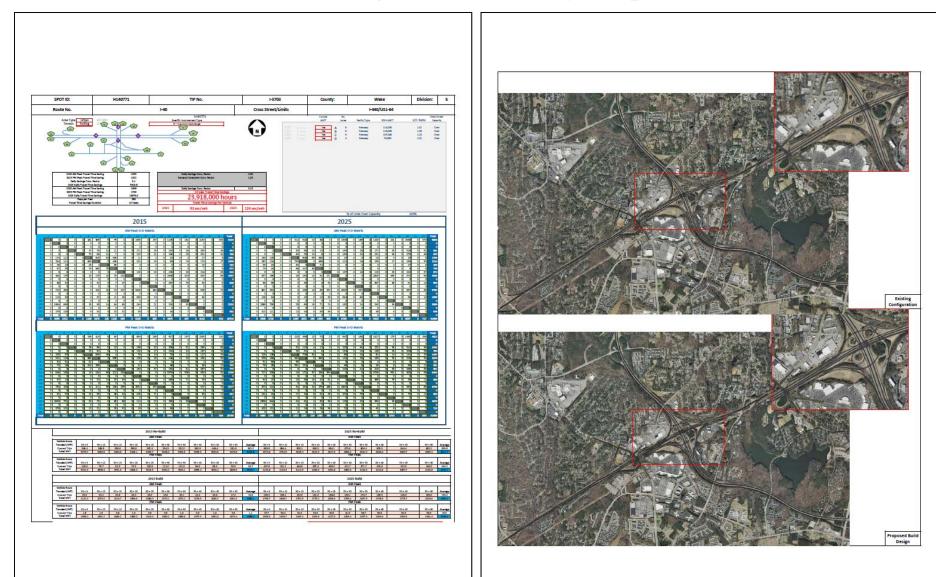
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P4.0 Project Summary Reports





P4.0 Project Summary Reports



Intersection, Interchange, Superstreet and Operational Projects

P4.0 - Congestion Management Projects Analyzed	Statewide	Regional - Division	Total
Total Projects	157	185	342
Removed or No Travel Time Savings	25	23	48
Total Projects Analyzed	132	162	294

Total Projects submitted to P4.0 - 272

Intersection, Interchange, Superstreet and Operational Projects Project Team

Project Managers









Project Modeling and Analysis AECOM ATKINS HNTB Kimley Horn







Travel Time Savings for Corridor Projects



Travel Time Savings for Corridor Projects

SPOT worked closely with TPB and PB to evaluate projects in NCSTM for Statewide Mobility corridor projects

Iterative process – SPOT thoroughly reviewed results

SPOT worked with team of MPO, RPO, and Division staff to ensure results were reasonable and acceptable

Team of NCDOT and consultant subject matter experts reviewed results from Congestion Management Team and NCSTM to ensure results were fair and reasonable across the different approaches (multiple week process)

Costs

Costs were automatically generated in SPOT Online for all projects. However these were only used if a more accurate estimate wasn't available.

Multiple units provided more accurate costs:

TIP Unit – recent TIP estimates if available

NCTA – costs and estimated toll revenues for all toll and managed lane projects

ITS and Signals Unit – costs for all signal system and ITS projects

Feasibility Studies Unit – reviewed estimates for non-TIP and other projects (see next slide)

Costs Feasibility Studies Unit Review



Costs – Feasibility Studies Unit Review

Once the list of Existing and New projects being prioritized was available, the Feasibility Studies Unit did a cursory review of the on the cost estimates being used in Prioritization 4.0 using the following steps.

1. Sort the existing projects into New, Non-TIP and Existing TIP projects

- Focus was on existing Non TIP and New projects with some TIP based on if there were concerns with the existing estimates being from the P3.0 Cost Estimate Tool
- Of these, we focused on projects with known concerns from P3.0 estimates
 - An example is urban/suburban interchange projects with lots of development
- In the Existing and New Prioritization Projects spreadsheets that we screened there were:
 - 433 Existing Projects with TIP numbers
 - 319 Existing Projects without TIP numbers
 - 304 New Projects
 - 226 Projects in the Holding Tank

Costs – Feasibility Studies Unit Review

- 2. Determine if there has been a previous Feasibility Study or Express Design that is a good representation of the current project
 - Yes- Inflate to current year dollars
 - No- Using Engineering Judgement and Aerial photography, generate a cost estimate using the SPOT Online Cost Estimate Tool for P4.0 and consider potential right of way implications on aerial photographs.
 - Compare to the estimate provided by the Strategic Prioritization Office and report finding to Strategic Prioritization Office.

Data Review and Remaining Highway Scoring Process

MPOs, RPOs, and Divisions reviewed project data over two week period (January-February)

SPOT reviewed all comments and updated data (took several weeks)

SPOT worked with EDR-Group and PB on data inputs for TREDIS (first time using Statewide Model and new TREDIS input format)

SPOT "pushed the button" and scored all projects once the data was finalized

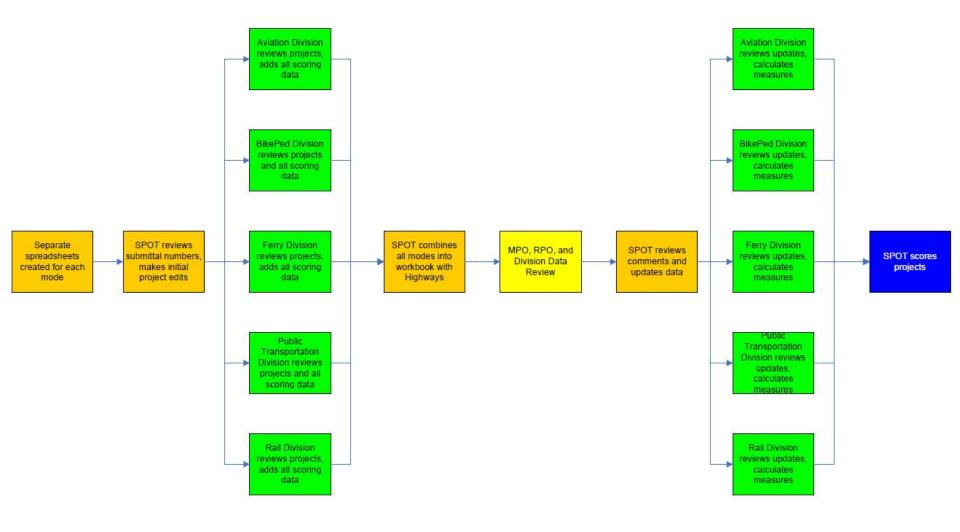


Cambridge Systematics reviewed all formulas to ensure calculations and scaling were correctly implemented

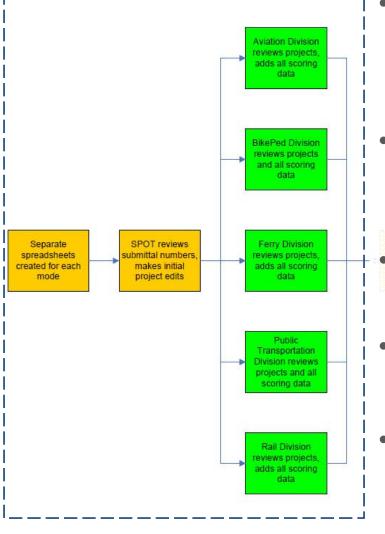
Non-Highway Projects Scoring Process



Non-Highway Projects Scoring Process



Non-Highway Projects Scoring Process *Data Review/Completion Phase*



- Reminder: Aviation, Ferry, and Rail Existing projects were processed and submitted by SPOT, but Bike/Ped and Public Transit Existing projects were to be processed and submitted by partners
- SPOT had to check against Existing projects lists to ensure partners had submitted all intended – much follow-up communication
- SPOT performed any initial edits/comments provided by partners that were noticed during or after submittal period
- Ex. incorrect airport name, incorrect STI category
- Each spreadsheet then provided to modal division to review submitted projects for eligibility and accuracy, review any scoring data from SPOT On!ine, and add remaining necessary scoring data

Non-Highway Projects Data Review/Completion Challenges

Each mode had different amounts of data provided from SPOT On!ine

Location info not processed in SPOT On!ine for non-GIS modes (Aviation, Ferry, Public Transit, Rail)

- MPO/RPO
- Division
- Funding Region
- County

NO scoring data provided from SPOT On!ine for Aviation, Ferry, and Rail – all manually provided by modal divisions

BikePed and Public Transit scoring data mostly provided by submitters in SPOT On!ine, but not without issues

• Export issues in SPOT On!ine

Division of Aviation

Reviewed projects for eligibility and accuracy

- Program Engineer and all Airport Project Managers reviewed each project (all with comments)
- Many projects were removed for various reasons, such as...
 - Not being eligible under STI (ex. new definition for capital projects for P4.0
 - No longer being requested in Partner Connect
- Projects noted if not yet in Partner Connect or edited if descriptions or costs did not match (some projects also combined)
- Cost to NCDOT edited for all projects to reflect 90% of the total cost, or the maximum amount allowed per STI category
- Location info manually completed for all new projects

Added all columns and data to be used in scoring

Div of Aviation Comments	Reason removed from P4
kmv - cost in partner connect is \$2,500,000; note cost to NCDOT not to exceed \$300,000 for regional tier airports	
kmv - More of a maintenance , Project not eligible for SPOT P4	a - does not exceed system plan objectives
kmv - More of a maintenance than capital improvement, Project not Eligible for SPOT P4	a - does not exceed system plan objectives
rsb - ok	
rsb - PC number incorrect, no new terminal shown in PC	

Bicycle and Pedestrian Division

Reviewed projects for eligibility and accuracy

Reviewed all scoring data from SPOT On!ine

- Export issues in SPOT On!ine with some data required manual re-entry for some data, and detailed review for accuracy
 - Missing fields, ex. Average Speed Limit, Local Government, all Connection Points
 - Error with Primary Destinations as Major Centers
 - Error with Secondary Destinations
 - Some destinations no longer eligible
 - Connection Point totals counted "None"
- Edited SITs as necessary
- Noted corrections needed by submitters on cost, destinations, etc.
- Added necessary columns for data lookup values (ex. speed limit points)
- Reminder: different data for bicycle vs. pedestrian projects

Div of BikePed Comments	Items Needing Submitter Attention	
Connection=none had populated as 1 connection. Changed to 0.	Project does not meet 20% match requirement. Please update cost fields to show that CostToNCDOT is 80% or less of ActualProjectCost.	
Greenway is a Major Destination	Please fill in missing secondary center type.	
Greenway is a Major Destination	 Project does not meet 20% match requirement. Please update cost fields to show that CostToNCDDT is 80% or less of ActualProjectCost. 2. Please fill in missing secondary destination type. 	

Ferry Division

Reviewed projects for eligibility and accuracy

- Deleted project no longer needed
- Location info manually completed for new projects

Added all columns and data to be used in scoring

Public Transportation Division

Reviewed projects for eligibility and accuracy

Reviewed all scoring data from SPOT On!ine

- Many projects were missing data from details section that was not entered – these needs were noted for submitters to complete
- Edited Cost to NCDOT for all projects to reflect correct state share
- Noted corrections needed by submitters on costs/shares
- Minor export issues in SPOT On!ine

SPOT assisted

- Edited ownership info as needed for projects in multiple jurisdictions
- Coordinated ownership info for projects missing submitter-entered info

Items Needing Submitter Attention Please verify cost to NCDOT; missing projected unlinked passenger trips; missing system ridership over past 5 years Please verify cost to NCDOT;

Please verify estimated total project cost; verify other project funding sources; Please verify cost to NCDOT; missing all Details -- Vehicle

Rail Division

Reviewed projects for eligibility and accuracy

- Planning Engineers reviewed each project
- Deleted projects as needed, with concurrence from submitters
- Location info manually completed for all new projects

Added all columns and data to be used in scoring

- Each project was scored individually
- Reminder: different data for each different Rail SIT

Non-Highway Projects Data Review/Completion

After data review/completion phase, modal divisions provided individual spreadsheets back to SPOT to combine into one workbook with Highways

• Much formatting and coordination of information needed by SPOT

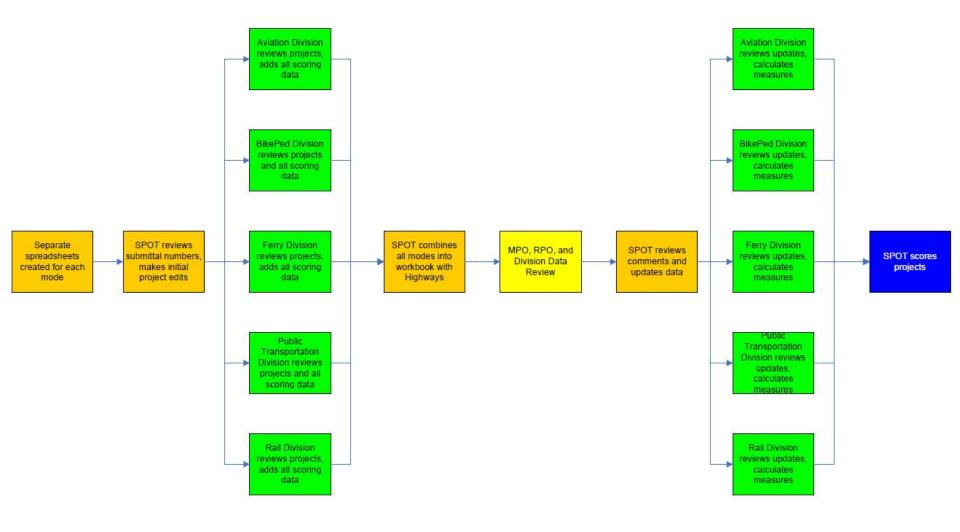
MPOs, RPOs, and Divisions reviewed project data over two week period (January-February)

• Included all data corrections needed by submitters for Aviation, BikePed, and Public Transportation projects

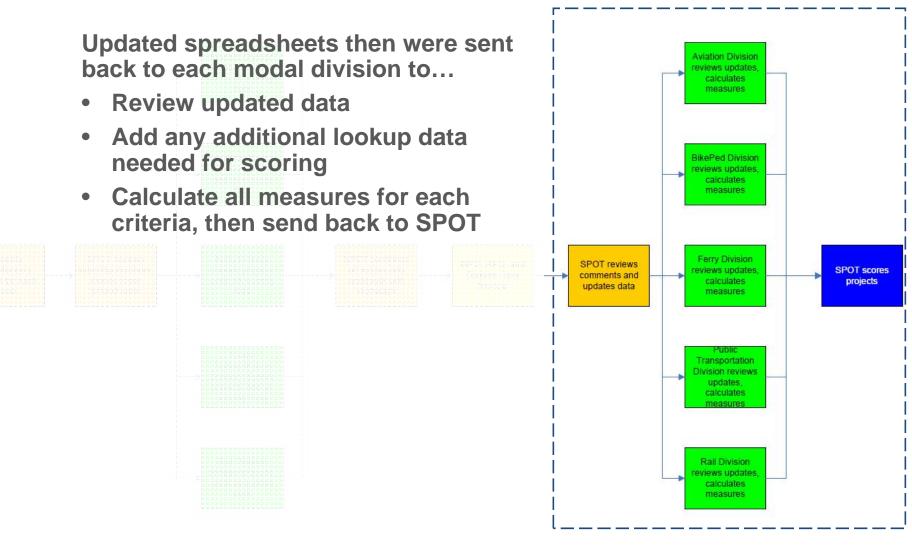
SPOT reviewed all comments and updated data for each mode (took several weeks)

• This included intensive effort by SPOT following up on all needed submitter corrections that were not addressed during the two week period

Non-Highway Projects Scoring Process



Non-Highway Projects Scoring Process *Scoring Phase*



Non-Highway Projects Scoring

SPOT "pushed the button" and scored all projects once the data was finalized



Each mode reviewed all criteria formulas to ensure calculations were correct for each different project type

Final Steps



Finalizing Quantitative Scores and Programming Statewide Projects

Once quantitative scores for all modes were finalized, all projects combined back into one spreadsheet

Scores sent to TIP Unit

TIP Unit programs Statewide Projects based on scores, federal and state regulations, delivery schedules, and funding availability

Scores released

Revised P4.0 Schedule of Key Dates

Date	Activity
April 13, 2016	Quantitative Scores and Draft list of Programmed Statewide Mobility Projects released
April 18, 2016 – July 29, 2016	Regional Impact Local Input Points assignment window open (Division Needs Local Input Points optional)
August 2016	NCDOT calculates Regional Impact total scores and programs Regional Impact projects
September – October 2016	Division Needs Local Input Point window opens for 2 months
November 2016	NCDOT calculates Division Needs total scores and programs Division Needs projects
December 2016	NCDOT prepares 2018-2027 Draft STIP
January 2017	2018-2027 Draft STIP released

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http://www.ncdot.gov/strategictransportationinvestments/