ITS Sketch Plans

Draft Corridor Sketch Plan Methodology – Scenario Discussion

presented to
Wisconsin Department of Transportation

presented by
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Cambridge Systematics, Inc.

2/7/06

Agenda

- Schedule/Progress
  - Smartways Annual Meeting – Sketch Plan Presentation?
- Updated criteria
- Concepts for communicating results
- Sketch Planning Scenario

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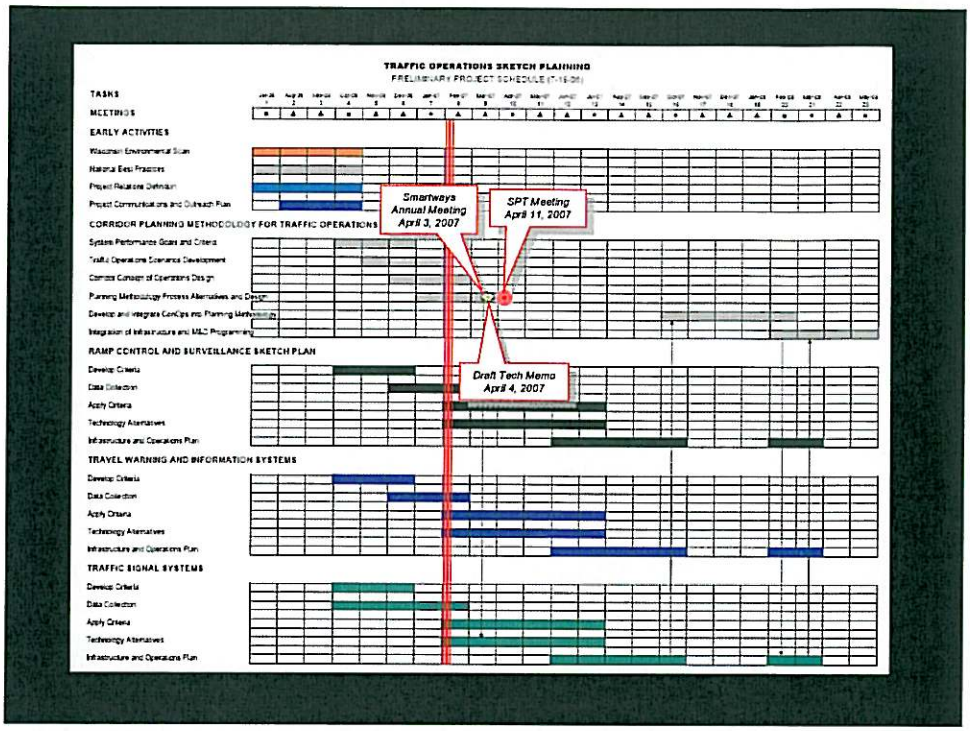
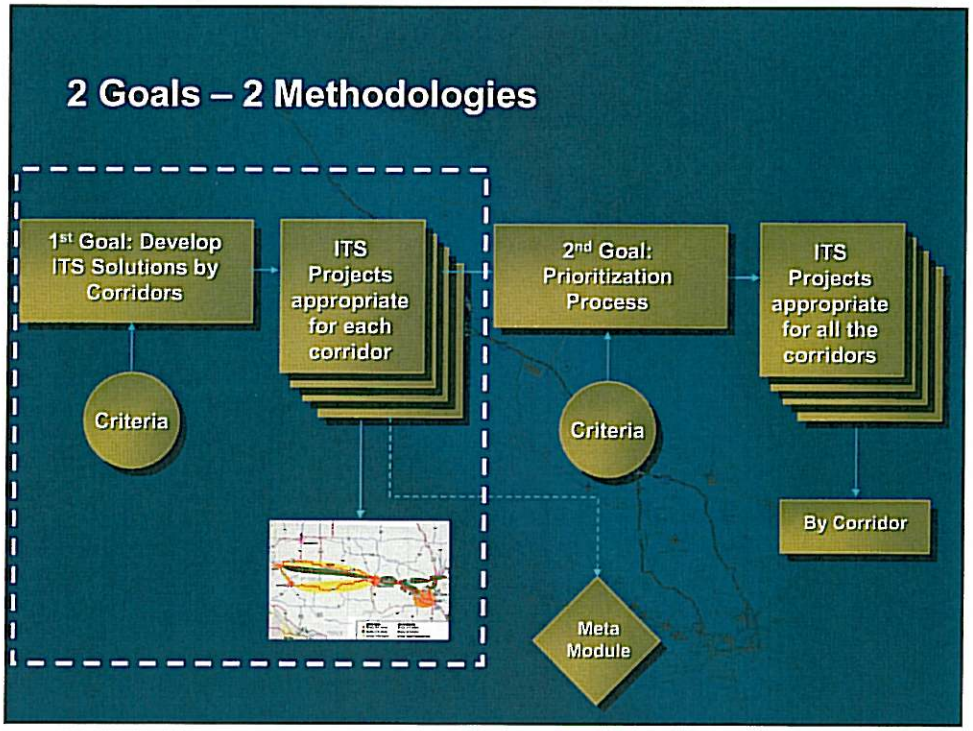

TRAFFIC OPERATIONS SKETCH PLANNING
PRELIMINARY PROJECT SCHEDULE
TASKS
MEETINGS
EARLY ACTIVITIES
Wisconsin Environmental Scan
National Best Practices
Project Relations Definition
Project Communications and Outreach Plan
CORRIDOR PLANNING METHODOLOGY FOR TRAFFIC OPERATIONS
System Performance Goals and Criteria
Traffic Operations Scenarios Development
Corridor Concept of Operations Design
Planning Methodology Process Alternatives and Design
Develop and Integrate ConOps into Planning Methodology
Integration of Infrastructure and M&O Programming
RAMP CONTROL AND SURVEILLANCE SKETCH PLAN
Develop Criteria
Data Collection
Apply Criteria
Technology Alternatives
Infrastructure and Operations Plan
TRAVEL WARNING AND INFORMATION SYSTEMS
Develop Criteria
Data Collection
Apply Criteria
Technology Alternatives
Infrastructure and Operations Plan
TRAFFIC SIGNAL SYSTEMS
Develop Criteria
Data Collection
Apply Criteria
Technology Alternatives
Infrastructure and Operations Plan
Smartways Annual Meeting April 3, 2007
SPT Meeting April 11, 2007
Draft Tech Memo April 4, 2007


2 Goals – 2 Methodologies
1st Goal: Develop ITS Solutions by Corridors
ITS Projects appropriate for each corridor
2nd Goal: Prioritization Process
ITS Projects appropriate for all the corridors
Criteria
Criteria
By Corridor
Meta Module

Updating Sketch Planning Criteria

Sketch Planning Methodology Criteria

- Used 42 initial criteria as starting point
  - Must be consistent with main Corridor Planning Methodology
  - Realistically measure the effectiveness of alternatives
  - Allow operational alternative to be compared
    - With each other
    - With other types of improvements
    - Drives toward a hybrid approach that includes traditional as well as operational metrics
  - Data readily available
    - Quality controlled
    - Regularly updated
  - Results can be easily summarized

Stage One Factors (Quantitative)	
Mobility	**50%**
Functional Class/Corridor 2020 Designation	15%
Year 2020 LOS	20%
Truck ADT	10%
Recreation Factor Group	5%
Safety	**20%**
Crash Rate	10%
Crash Severity	10%
Development Pressure	**30%**
Population Projections by CVT to 2020	15%
Land Conversion Rate by CVT from Ag/Vacant to Residential, Commercial, Manufacturing, 1990-2008	15%

Corridor Planning Criteria

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Initial Criteria

- Focused on three benefit categories
  - Mobility
  - Safety
  - Adverse Environmental Conditions
- Two updates
  - First updated a SPT Stakeholder Meeting in December
  - Updated again as part of Technical Memorandum # 3

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Initial Traffic Operations Sketch Planning Criteria

Mobility	Safety
Speed change	Crash Rate
Ramp closures	Hot Spots
Peak hour volume capacity volume/capacity/hour	Severity
Lane closures	**Environmental Conditions**
Staff response time *	Fog *
Ramp closure history	Snow/Ice *
Ramp corridor criteria	Flooding *
2020 functional class	Signalized intersection spacing *
2000 ADT	New/upgraded signal installation *
2020 ADT	Condition of existing signal *
ADT on crossing routes *	Availability of alternative routes *
2020 congestion	Route importance *
2000 HCADT or %	2000 population
Forecasted HCADT or %	Event centers *
Alternate route travel time ratio *	Event attendance vs. area *
Alternate route utilization *	Projected amount of distribution centers *
Length of alternate route *	Military access *
Proximity of alternate route *	Trauma center level 1 or 2 *
Is alternate route active or passive *	Risk
Signal jurisdiction *	Sustainability
Alternate route connection points *	Recreational factor *
	Land conversion rate *

Updating the Criteria

- Goal: Reduce to manageable number while ensuring operational flavor of criteria are still capture.
  - Readily available data
  - Easily summarized
  - Could be easily ranked
- Process resulted in a reduction from 42 criteria to 12.

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Updating the Criteria

- Initial Concept – Create a series of criteria
  - Grouped around functional areas
    - i.e. Ramp Meters, Traveler Information
- Patterns emerged that lent themselves to grouping
  - Weather
    - Fog, Snow, Flooding
  - Event Generators
    - Event Centers, Military Bases, Trauma Centers etc.
- Difficulty to capture reliable data
  - Staff Response time, Ramp Closure History
- Alternate Route criteria
- Signal centric criteria

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Updated Criteria

Mobility
ADT Base Year
ADT Forecast Year
HC ADT Base Year
HC ADT Forecast Year
Peak Hour V/C – LOS
Congestion Forecast Year – LOS
Safety
Crash Rate
Crash Severity
Weather Index
Developmental Pressures
ADT Growth (from Base to Forecast)
HC ADT Growth (from Base to Forecast)
Event/Traffic Generators

- Data for 11 out of the 12 criteria can be found in Meta Manager
  - Weather not found
  - Growth rates calculated
  - Consider future requirements

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Weighting Criteria

Criteria	Weight
Mobility	50%
ADT Base Year	10%
ADT Forecast Year	10%
HC ADT Base Year	5%
HC ADT Forecast Year	5%
Peak Hour V/C – LOS	10%
Congestion Forecast Year – LOS	10%
Safety	20%
Crash Rate	7.5%
Crash Severity	7.5%
Weather Index	5%
Developmental Pressures	30%
ADT Growth	10%
HC ADT Growth	10%
Event/Traffic Generators	10%

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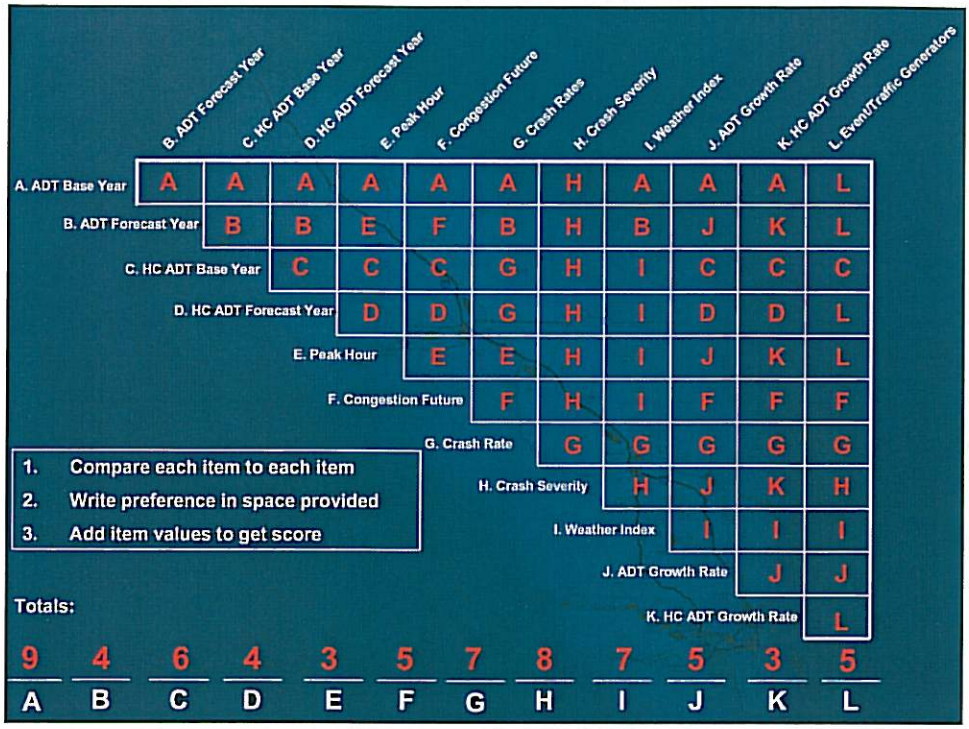
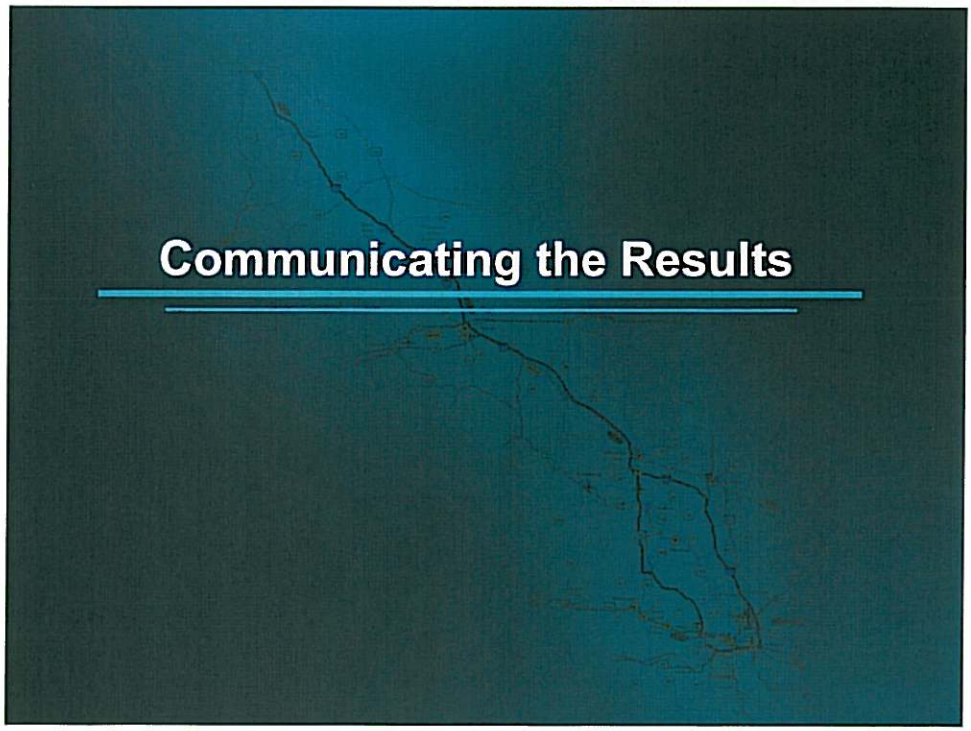

B. ADT Forecast Year
C. HC ADT Base Year
D. HC ADT Forecast Year
E. Peak Hour
F. Congestion Future
G. Crash Rates
H. Crash Severity
I. Weather Index
J. ADT Growth Rate
K. HC ADT Growth Rate
L. Event/Traffic Generators
A. ADT Base Year A A A A A A H A A A L
B. ADT Forecast Year B B E F B H B J K L
C. HC ADT Base Year C C G H I C C C
D. HC ADT Forecast Year D D G H I D D L
E. Peak Hour E E H I J K L
F. Congestion Future F H I F F F
G. Crash Rate G G G G G
H. Crash Severity H J K H
I. Weather Index I I I
J. ADT Growth Rate J J
K. HC ADT Growth Rate L
1. Compare each item to each item
2. Write preference in space provided
3. Add item values to get score
Totals:
9 4 6 4 3 5 7 8 7 5 3 5
A B C D E F G H I J K L


Communicating the Results

Communicating Results

- Goal: Develop ITS Corridor Sketch Plan maps that demonstrate recommended ITS/Operational solutions while still matching overall Corridor Planning Methodology work.
- Challenges:
  - Need for consistency across plans (i.e. GIS Standards)
  - Long statewide corridors (200 miles)
  - Need to show detail for a variety of deployments
  - Level of deployment not location of deployment

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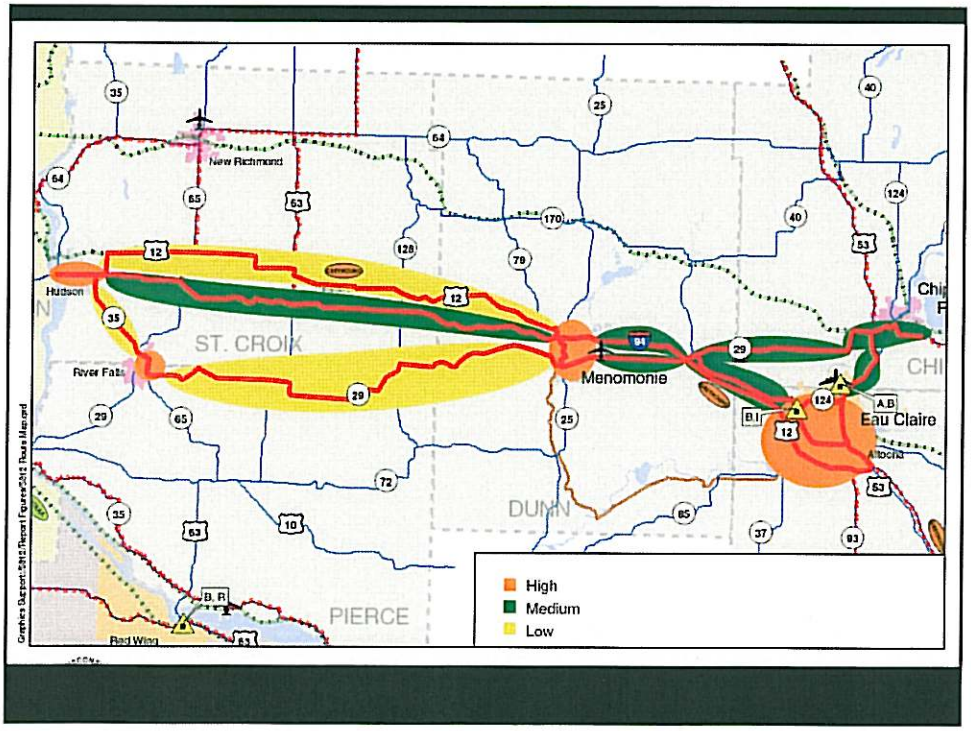
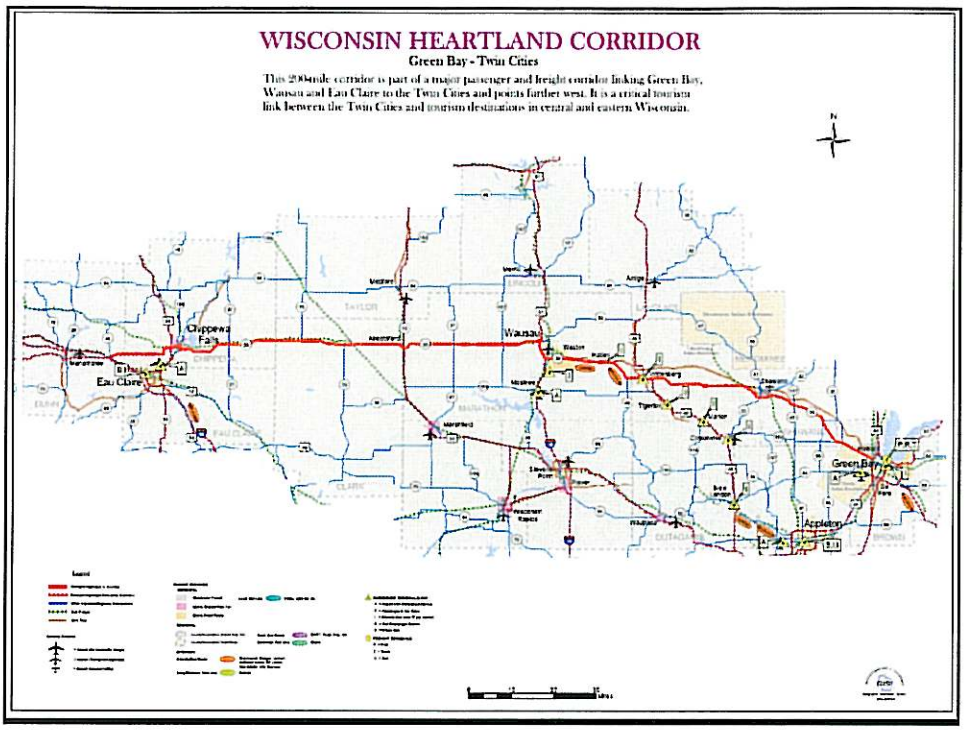
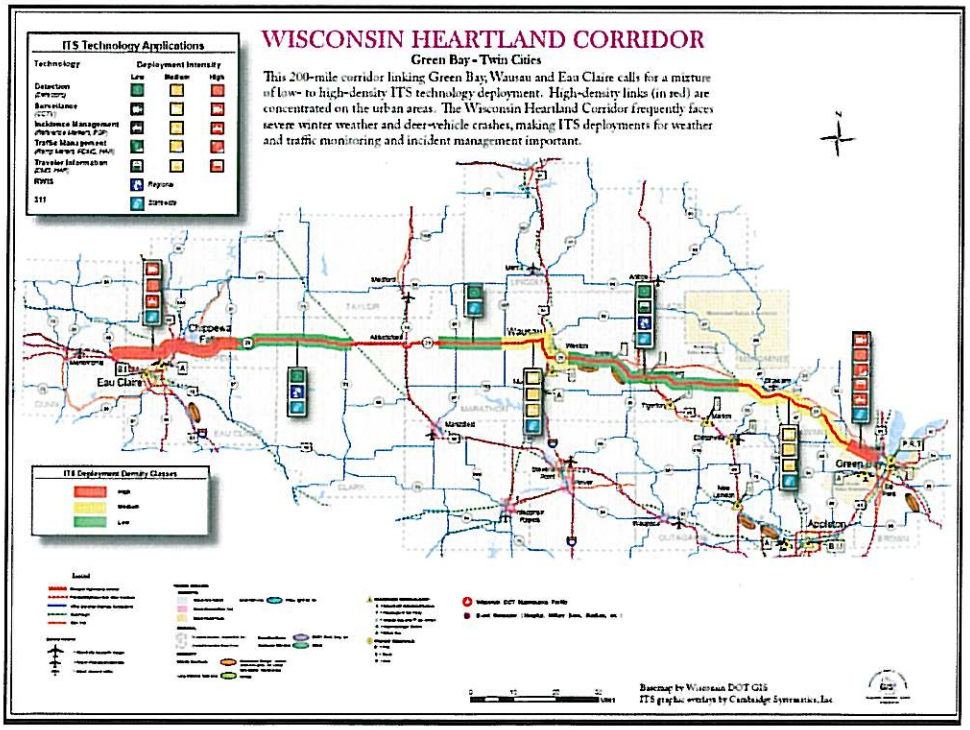
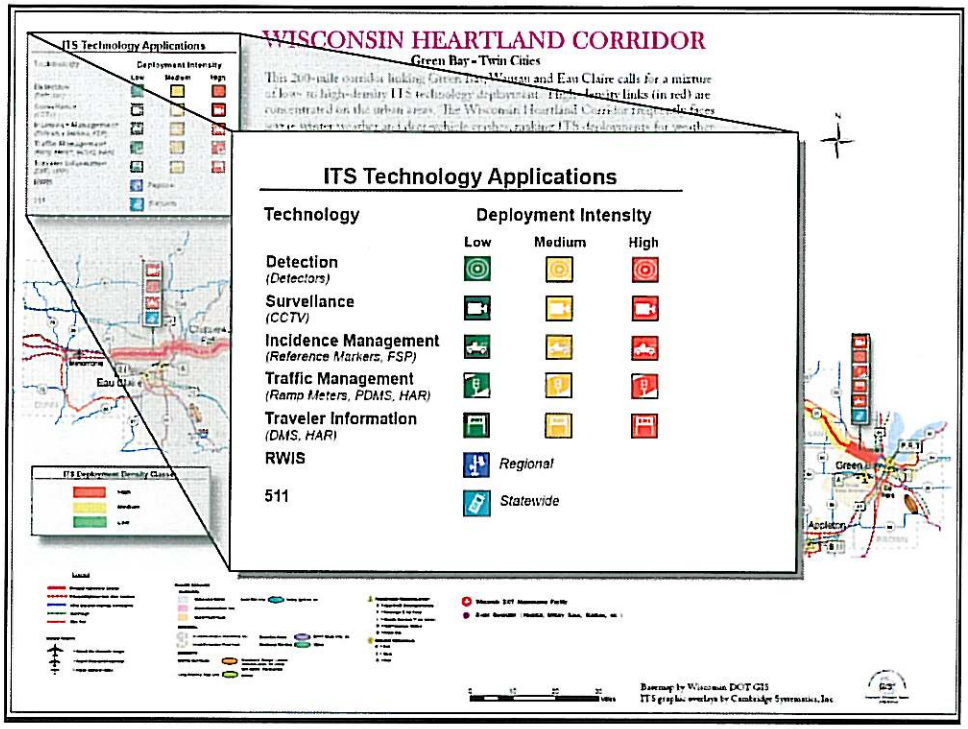
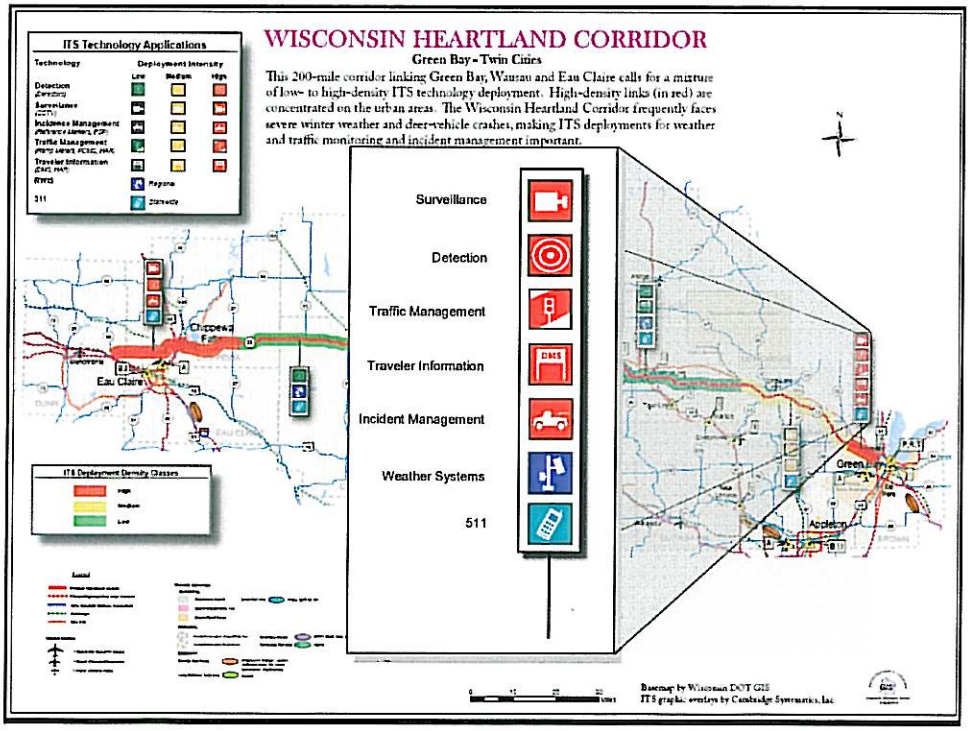



WISCONSIN HEARTLAND CORRIDOR
Green Bay - Twin Cities
This 200-mile corridor is part of a major passenger and freight corridor linking Green Bay, Wausau and Eau Claire to the Twin Cities and points further west. It is a critical tourism link between the Twin Cities and tourism destinations in central and eastern Wisconsin.
Chippewa Falls
Eau Claire
Wausau
Green Bay
Appleton


ITS Technology Applications
Technology
Deployment Intensity
Low
Medium
High
Detection
Surveillance
Incidence Management
Traffic Management
Traveler Information
RWIS
511
Regional
Statewide
WISCONSIN HEARTLAND CORRIDOR
Green Bay - Twin Cities
This 200-mile corridor linking Green Bay, Wausau and Eau Claire calls for a mixture of low- to high-density ITS technology deployment. High-density links (in red) are concentrated on the urban areas. The Wisconsin Heartland Corridor frequently faces severe winter weather and deer-vehicle crashes, making ITS deployments for weather and traffic monitoring and incident management important.
ITS Deployment Density Classes
High
Medium
Low
Chippewa Falls
Eau Claire
Wausau
Green Bay
Appleton
Basemap by Wisconsin DOT GIS
ITS graphic overlays by Cambridge Systematics, Inc


WISCONSIN HEARTLAND CORRIDOR
Green Bay - Twin Cities
ITS Technology Applications
Technology
Deployment Intensity
Low
Medium
High
Detection
(Detectors)
Surveillance
(CCTV)
Incidence Management
(Reference Markers, FSP)
Traffic Management
(Ramp Meters, PDMS, HAR)
Traveler Information
(DMS, HAR)
RWIS
Regional
511
Statewide
Eau Claire
Chippewa Falls
Green Bay
Appleton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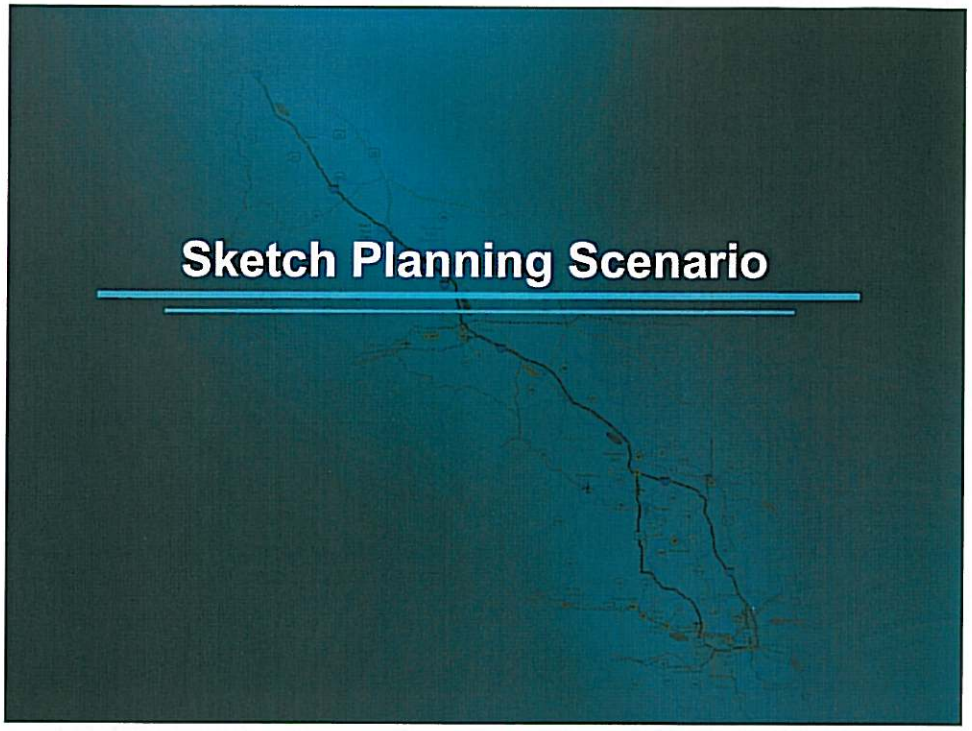
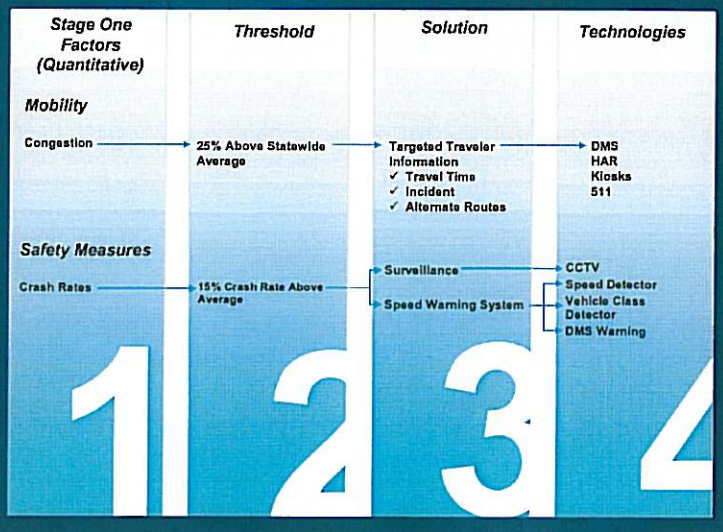
ITS Technology Applications
Surveillance
Detection
Traffic Management
Traveler Information
Incident Management
Weather Systems
511
Eau Claire
Chippewa Falls
Green Bay
Appleton



Sketch Planning Methodology
Overview



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Sketch Planning Methodology
Characteristics

- Uses 12 Basic Criteria identified
- Data readily available from existing sources
- Data updated at least annually
- Minimal manipulation of data required

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Sketch Planning Methodology
Characteristics

- Analysis conducted in spreadsheet format that can be widely disseminated and easily used
- Criteria closely related to those in Connections 2030
- Takes functional approach to ITS deployment
  - Flexible with regard to technologies deployed
  - Will be able to incorporate new technologies as they emerge

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Sketch Planning Methodology
Process

- Define Corridor Segment
  - Relatively homogeneous traffic characteristics and land use
  - 5 to 10 miles for urban freeway corridors
  - 10 to 50 miles for rural freeway corridors
  - Shorter for arterial corridors
- Compile corridor data
- Compare to threshold levels
  - Modify thresholds as needed

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Sketch Planning Methodology
Process

- Identify tier for operational strategies
- Calculate points for segment
- Apply weights
  - Modify as needed to reflect corridor characteristics
- Identify recommended strategy based on score
- Modify strategy to reflect local concerns
  - Hot spots
  - Corridor characteristics

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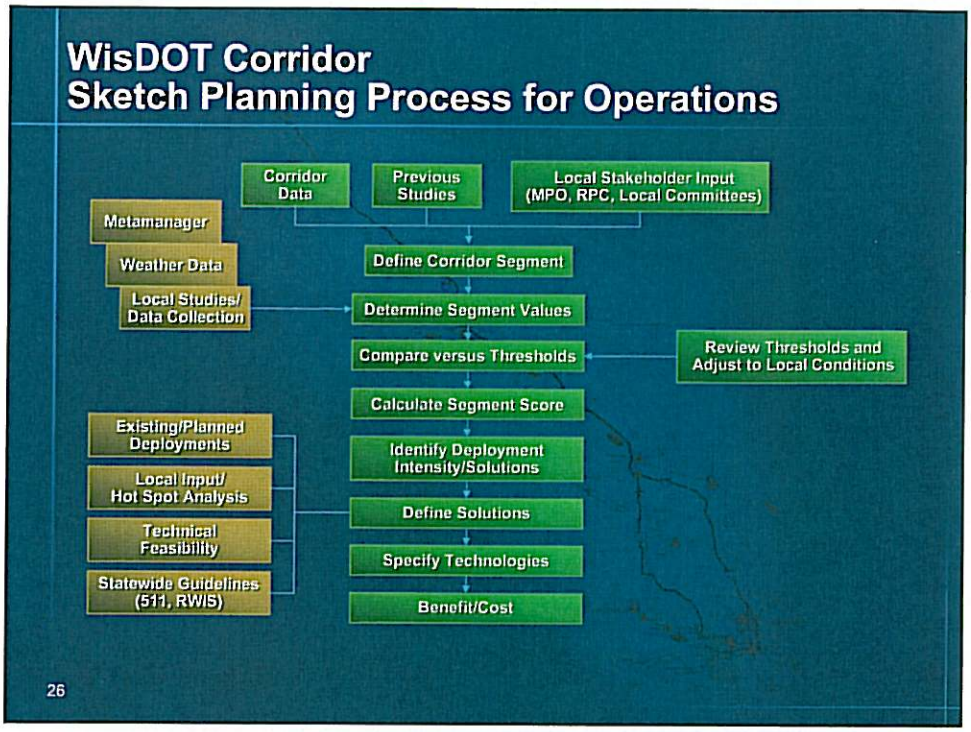
WisDOT Corridor Sketch Planning Process for Operations



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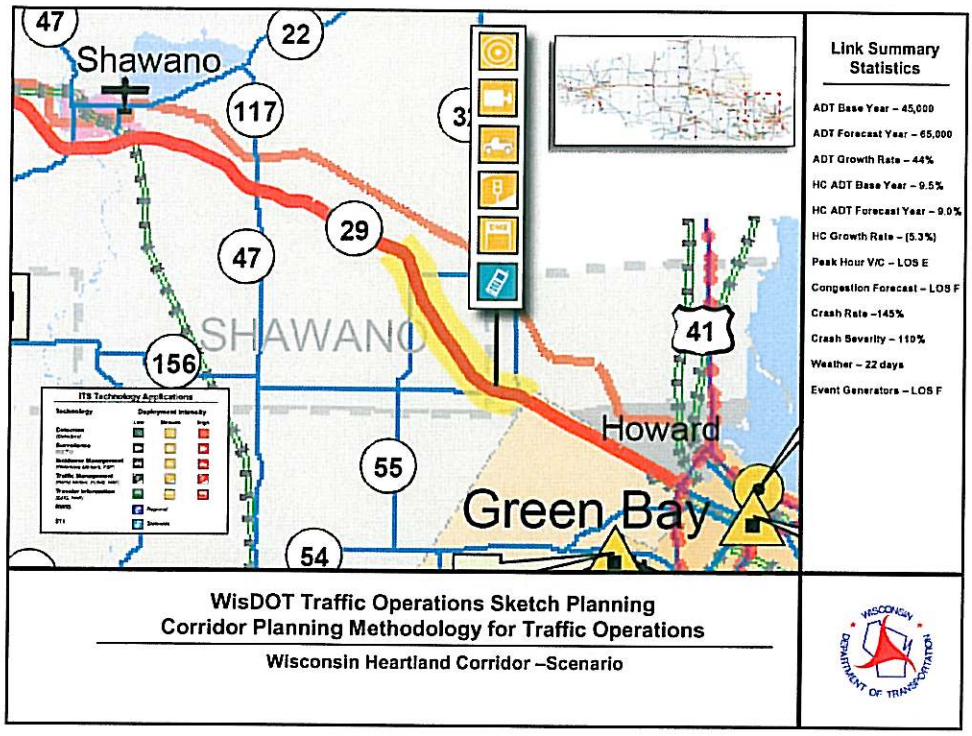
Sketch Planning Scenario

	Urban Fwy	Urban Art	Rural Fwy	Rural Art	Value	Points	Weight	Total Score
ADT Base Year								
Tier 1	<25,000	<10,000	<15,000	<5,000				
Tier 2	25,000 to 60,000	10,000 to 25,000	15,000 to 30,000	5,000 to 10,000	45,000	3	10	30.0
Tier 3	> 60,000	>25,000	>30,000	> 10,000				
Peak Hour V/C								
Tier 1	LOS D	LOS D	LOS D	LOS D				
Tier 2	LOS E	LOS E	LOS E	LOS E	E	3	10	30.0
Tier 3	LOS F	LOS F	LOS F	LOS F				



Next Steps

- Initiate Data Collection
- Finalize Methodology

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