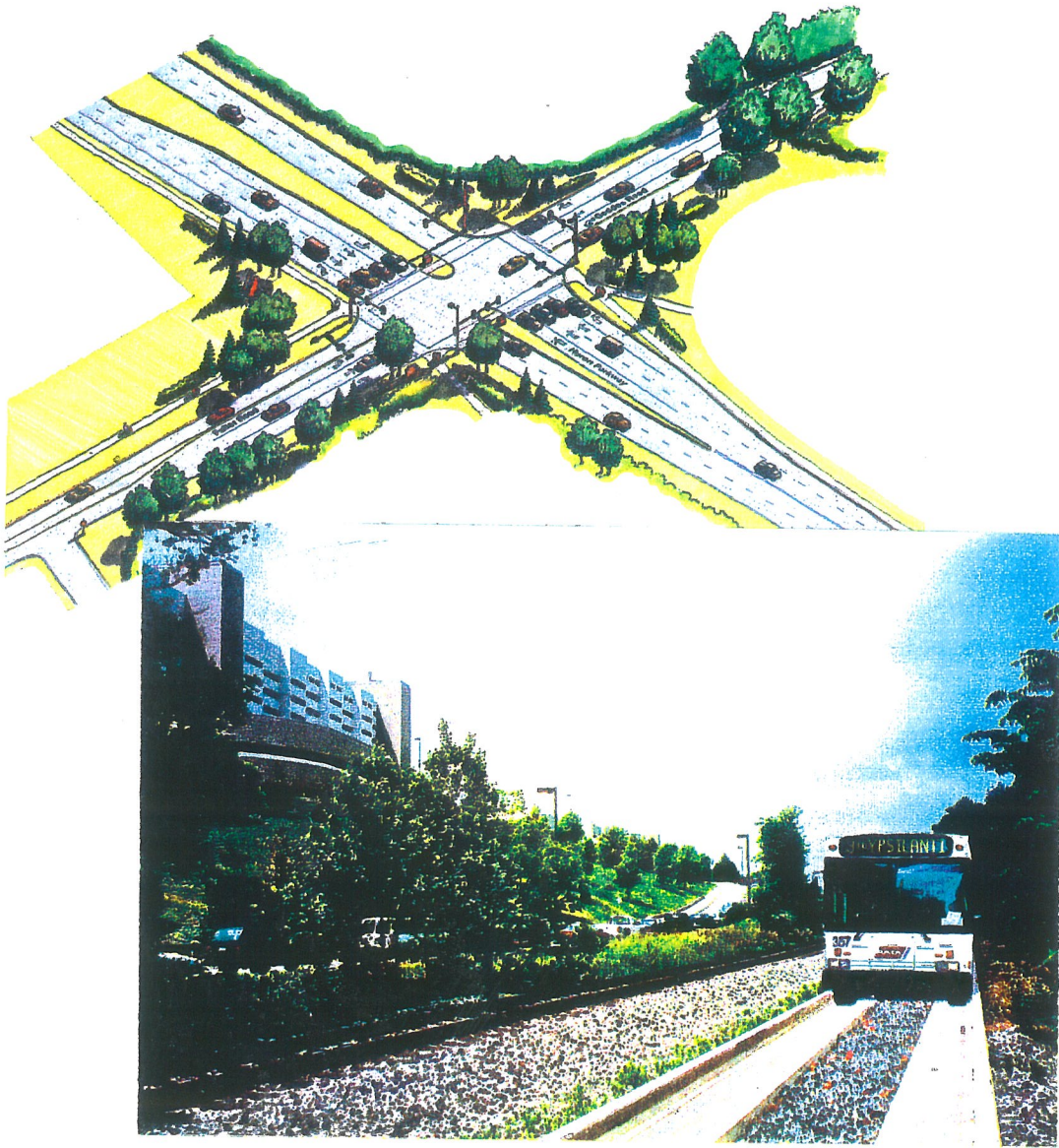
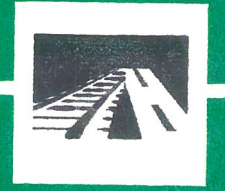


Geddes/Fuller/Conrail

Corridor Study



June 1994



IV. SCREEN 1 - FATAL FLAW ANALYSIS

The first screen of the Geddes/Fuller/Conrail study considered a "universe" of alternatives. This universe included a wide range of alternatives that could have any chance of meeting the objectives for the corridor. These alternatives were subjected to a fatal flaw analysis whereby the alternative either passed or failed the test.

SCREEN 1: ALTERNATIVES

A universe of alternative strategies was identified to address the problems facing the Geddes/Fuller/Conrail corridor. These strategies can be classified into five major categories:

- Travel Demand Management (TDM),
- Transportation System Management,
- Intelligent Vehicle-Highway Systems (IVHS) Applications,
- Environmental and Aesthetic Issues,
- Roadway Widening,
- No-build.

A listing of the alternative strategies available within each of these categories is presented below.

Travel Demand Management Strategies

Travel demand management encompasses strategies that coordinate the use of travel and maximize the effectiveness of current facilities. These strategies include carpools, congestion pricing and flexible work hours. By increasing the occupancy of vehicles, staggering the use of facilities and restricting the availability of facilities, travel demand management strategies are a low cost, low impact and effective manner to reduce congestion. The travel demand management strategies considered for this study were:

Trip Reduction Ordinances

- Special use permits,
- Negotiated agreements,
- Trip reduction goals,
- Mandated ridesharing programs, and
- Transportation management funds and districts.

Employer-Based Transportation Management

- Employee financial incentives,
- On-site employer transportation coordinator,

- Transit/RideShare services,
- Vanpools,
- Carpool matching efforts,
- Telecommunication systems,
- Staggered work hours,
- Flex time,
- Four-day work week, and
- Telecommuting.

Driving Restrictions

- Voluntary No-Drive Days,
- Route diversion, and
- Control of truck movement.

Parking Management Programs

- Off-street parking restrictions,
- On-street parking controls,
- Control of parking supply,
- Commercial vehicle restrictions/priorities, and
- Residential Parking Permit Programs (RPPPs).

Road Pricing

- Toll collection,
- Taxes and/or fees, and
- Congestion pricing.

Area-Wide RideShare Incentives

- Area-wide programs,
- Transportation management organizations, and
- Tax incentives.

Traffic Management Plans

- Special events (e.g., athletic events, concerts, assemblies), and
- Adverse weather conditions.

Transportation System Management Strategies

Transportation system management strategies seek to make improvements in transportation facilities to improve the effectiveness of the overall travel environment. These strategies can have a wide range of costs, benefits and impacts. Because they are based on infrastructure improvements, they are very site specific and need to be evaluated against the available options, needs and constraints of the site. The specific transportation

system management strategies considered for this study were:

Improved Public Transportation

- Increased bus service
 - Express with feeder,
 - Higher frequency (shorter headways),
 - Charter bus services,
 - Subscription bus,
 - Dial-a-ride,
 - Provide bus loading facilities with shelters.
- Pricing programs to promote increased ridership,
 - Free ride days,
 - Employer subsidies.
- Exclusive busway/guideway on Conrail,
 - 1 lane,
 - 2 lanes,
 - Combination 1 and 2 lanes.
- Bus Rapid Transit/Preferential Treatment,
 - Reserved freeway/highway/arterial lane(s),
 - Contraflow/Curb bus lane,
 - Normal flow/Curb bus lane,
 - Metered freeway/highway/arterial,
 - Preference in street signing,
 - Preference in traffic signals,
 - Normal-flow curb bus lane,
 - Median bus lane,
 - Bus only streets.
- Street Improvements
 - Pavement surface improvements and drainage features,
 - Increased curb return radii,
 - Parking restrictions,
 - One-way streets.

Park-and-Ride/Fringe Parking

- Satellite (Distant) Park and Ride,
- Fringe/periphery parking,

- Shuttle service,
- Carpool services.

Traffic Flow Improvements

- Build new roadways,
- Expand/widen existing roadways,
- Alter speed limits,
- Improve efficiency of existing roadways,
 - Replace/refurbish traffic control devices (e.g., signing, striping, painted islands, etc.),
 - Resurfacing, restoration, and rehabilitation (RRR) projects,
 - Improve sight distance (e.g., provide lighting, clearing ROW),
 - Mid-block improvements (modifications to property access).
- Intersection Improvements,
 - Provide additional turning lanes,
 - Correct offsets,
 - Widening,
 - Eliminate approach sight distance obstacles,
 - Replace/refurbish traffic control devices (e.g., signing, striping, painted islands, signal heads, etc.),
 - Provide new traffic control devices,
 - Optimize signal phasing of single intersections,
 - Establish a progressive system of signalized intersections,
 - Signalize existing non-signalized intersections.
- High-Occupancy Vehicle Facilities,
 - Contra-flow lanes (1 or 2),
 - Normal-flow lanes (1 or 2).

Creation and Preservation of Pedestrian Facilities

- Integrated System Spot Improvements
 - Provide/refurbish pedestrian signal displays,
 - Improve signal timing to accommodate pedestrian movement,
 - Remove obstacles to pedestrian movement (e.g., mailboxes, newspaper racks, sign posts, etc.),
 - Widen crosswalks,
 - Improve/provide sidewalk lighting,
 - Curb radii modifications for pedestrian movement.

- **Integrated System Concordance with Design Standards**
 - Provide (new) sidewalks where standards indicate sidewalks are required,
 - Provide pedestrian easements,
 - Pedestrian access to shopping centers, etc.,
 - Neighborhood intersection design improvements,
 - Provide refuge islands,
 - Provide system continuity throughout Ann Arbor for pedestrian movement and facilities.

- **Sidewalk Widening**
 - Reduce street widths in high-pedestrian movement areas,
 - Create arcade setbacks with new and reconstruction of buildings.

- Provide Partial Pedestrian Malls,
- Provide Full Pedestrian Malls,
- Auto-Free Zones,
- Convert existing alleys/streets to sidewalks,
- Central Park concept,
- Vertical Separation Systems,
 - Underground (tunnels) walkways,
 - Elevated walkways,
 - Skyway access across streets.

Creation and Preservation of Bicycle Facilities

- **Provide Bicycle Facilities**
 - Exclusive ROW with Protected Lane (Class I),
 - Restricted ROW with no through vehicles allowed (Class II),
 - Shared ROW with vehicular traffic (Class III).

- Integrate bicycle facilities into corridor circulation plan,
- Marketing strategies to promote bicycle use,
- Geometric design consistent with existing topography and human physical capabilities (i.e., flat grades, grade separation at busy intersections, etc.),
- Path delineation.

Traffic Calming

- Close/Eliminate roadway links,
- Eliminate access,

- Placement of physical barriers,
 - Rumble strips,
 - Raised pavement delineators (dots).

Intelligent Vehicle-Highway Systems

Intelligent Vehicle Highway Systems (IVHS) is a national initiative to apply technology-based solutions to make significant increases in safety, mobility, air quality and trip quality. The specific technologies considered for this study were:

- Advanced Traffic Management Systems (ATMS)
 - Traffic surveillance,
 - Dynamic signal control,
 - Changeable message signs,
 - Parking information,
 - Police/Emergency Incident Response,
 - Traffic advisory radio,
 - Traffic advisory television.
- Advanced Traveler Information Systems (ATIS),
 - On-board computers,
 - Palmtop computers,
 - Paging devices,
 - Cellular telephone.
- Commercial Vehicles Operations (CVO),
 - Automatic vehicle identification (AVI),
 - Weigh in motion monitors (WIMs).
- Advanced Public Transportation Systems (APTS),
 - Smart Bus,
 - Smart Cards,
 - Global Positioning System applications,
 - Computer-aided scheduling and dispatching,
 - Real-time trip information.
- Automated Highway Systems (AHS),
 - Collision avoidance systems,
 - Vehicle platooning.

- Advanced Rural Transportation Systems (ARTS),
 - Hazard avoidance,
 - Weather information.

Environmental and Aesthetic Issues

Any changes made to the infrastructure or operating characteristics of the transportation system within the corridor must be made in accordance with procedures and regulations for environmental and aesthetic issues. These issues include:

- Preserve lands fronting transportation routes,
- Land use decisions relating to transit,
- Enhance image of frontage roads.

No Build/Do Nothing

To complete the range of available alternatives considered for this study, a no-build or do-nothing option, and a construction option was considered. This provided a basis to compare the relative impact of considered improvements and an understanding of the impacts of not taken proactive steps in improving the corridor.

SCREEN 1: FATAL FLAW CRITERIA

Four major criteria were used to determine if a strategy could be passed on to subsequent evaluations. A strategy was evaluated against these criteria and the strategy either passed or failed. The criteria used to determine whether a strategy passed or failed Screen 1 were:

Appropriateness

Will application of the strategy attain goals and objectives specific to the Geddes/Fuller/Conrail corridor?

Effectiveness

Is the strategy likely to generate the desired results?

Is the strategy consistent with community goals and objectives specific to Ann Arbor?

Adequacy

Does the strategy correspond to the scale of the problem?

Does the strategy correspond to level of expectation of the problem solution?

Feasibility

Can legal or administrative barriers that could preclude implementation be overcome?

SCREEN 1: RESULTS

As a preliminary screening of strategies, the universe of 128 alternatives was first reduced to 35 candidates. The alternatives not passing this preliminary screening had fatal flaws and had no elements worthy of being considered for combination with other strategies.

The remaining 35 strategies were given a more thorough review and analysis for fatal flaws and possible elements for combination in other strategies. These 35 strategies and their Screen 1 results are presented in Table 4.

Of the 35 strategies reviewed in detail in Screen 1, 20 strategies received a pass rating. Of the 15 strategies that failed, four had elements that were considered desirable and warranted further review. From these twenty passing strategies and four additional elements, nine alternatives were developed for review in the second screening. Table 5 presents a summary of this analysis and how the first group of strategies are represented in the succeeding nine alternatives. The initial strategies that failed are indicated by a shaded row. The unshaded rows are the passing strategies. The columns list the nine new alternatives with a dot in the row of the initial passing strategy that has been included in the new alternative.

**TABLE 4
SCREEN 1 ANALYSIS RESULTS**

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
I. TRAVEL DEMAND MANAGEMENT			
1	One reversible HOV lane, toll SOV, no toll HOV in Conrail right-of-way.	Pass	Included in Alternative 3B; refer to Table 5.
2	Two HOV lanes, 2-directional toll SOV, no toll HOV in Conrail right-of-way.	Fail	<ul style="list-style-type: none"> • Not sensitive to the environment; • Does not correspond to scale of the problem.
3	Parking management and/or restrictions at: Area schools, Colleges, universities, high activity centers, major employers.	Pass	Included in Alternative 1; refer to Table 5.
4	Route diversions that direct traffic away from Geddes/Fuller.	Fail	<ul style="list-style-type: none"> • Does not encourage use of or provide alternative modes of transportation; • Private participation not likely.
5	RideShare programs/employer.	Pass	Included in Alternative 1; refer to Table 5.
II. TRANSPORTATION SYSTEM IMPROVEMENTS			
HOV FACILITY OPTIONS			
6	One reversible median HOV lane on Geddes/Fuller/Glen (U.S. 23 to Huron Street) NOTE: This alternative may be further segmented.	Fail, segments may pass	<ul style="list-style-type: none"> • Does not support other community goals and objectives; • Lacks sensitivity to existing land use and environmental concerns; • Private participation not likely. <p>However, used in Alternative 5 for comparative purposes.</p>

**TABLE 4
SCREEN 1 ANALYSIS RESULTS (Continued)**

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
7	Extend current HOV lanes on Geddes/Fuller/Glen to U.S. 23	Fail	<ul style="list-style-type: none"> • Does not correspond to scale of problem; • Does not support other community goals and objectives; • Lacks sensitivity to existing land use and environmental concerns; • Private participation not likely; • Legal barriers difficult to overcome.
8	Designate one HOV lane per direction on Huron Parkway. (Plymouth to Washtenaw) with one median HOV lane on Glazier/Fuller (Huron Parkway to Glen).	Fail	<ul style="list-style-type: none"> • Private participation not facilitated; • Does not correspond to scale of the problem; • Lacks sensitivity to existing land use and environmental concerns.
9	One reversible HOV lane on Washtenaw (Ypsilanti to Downtown Ann Arbor).	Fail	<ul style="list-style-type: none"> • Does not correspond to scale of the problem; • Not likely to generate the desired results; • Private participation not likely; • Lacks sensitivity to existing land use and environmental concerns.
10A	One HOV lane per direction on Plymouth (U.S. 23 to Main Street)	Fail	<ul style="list-style-type: none"> • Does not correspond to scale of the problem; • Not likely to generate the desired results; • Private participation not likely; • Lacks sensitivity to existing land use and environmental concerns.
10B	Designate 1 existing lane as HOV on Plymouth (U.S. 23 to Main Street)		
11	One HOV lane on Huron River Drive (Clark to Geddes/Fuller)	Fail	<ul style="list-style-type: none"> • Not sensitive to environment and land use; • Private participation not likely; • Potential for legal barriers-not easily overcome.

**TABLE 4
SCREEN 1 ANALYSIS RESULTS (Continued)**

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
12	One reversible HOV lane on Conrail Corridor.	Pass	Used in Alternative 3A; refer to Table 3.
13	Two HOV lanes on Conrail Corridor.	Fail	<ul style="list-style-type: none"> • Not sensitive to the environment; • Does not correspond to scale of the problem.
IMPROVE PUBLIC TRANSPORTATION			
14	Higher frequency of buses at: Washtenaw Corridor (Ypsilanti to U. of Michigan) Huron River Drive (Ypsilanti to Geddes Geddes/Fuller (Huron River Drive to U. of Michigan) Plymouth (Cherry Hill Road to U. of Michigan)	Pass	Used in Alternative 1; refer to Table 5.
15	Express bus and feeder bus system: Geddes/Fuller (Huron River Drive to U. of Michigan) Washtenaw Corridor (Ypsilanti to U. of Michigan) Plymouth (Cherry Hill Road to U. of Michigan)	Pass	Used in Alternatives 1 and 2; refer to Table 5.
16	Provide bus shelters in corridor and on other bus routes.	Pass	Used in Alternative 1; refer to Table 5.
STREET IMPROVEMENTS ON GEDDES/FULLER			
17	Widen roadway.	Fail	<ul style="list-style-type: none"> • Not sensitive to existing land use and environmental issues; • Would not generate desired results; • Does not encourage use of or provide alternate modes of transportation. <p>However, used in Alternatives 5 and 7.</p>

**TABLE 4
SCREEN 1 ANALYSIS RESULTS (Continued)**

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
18	One-way pair (Glazier/Fuller/ Geddes)	Fail	<ul style="list-style-type: none"> • Does not increase corridor throughput; • Does not promote use of or provide alternate modes of transportation; • Not likely to generate the desired results.
19	Provide park-and-ride lots with bus transfer	Pass	Used in Alternatives 1 and 2; refer to Table 5.
GUIDED BUSWAY / BUSWAY ON Conrail			
20	One lane reversible bus only.	Bus	Used in Alternative 2; refer to Table 5.
21	Two lane, 2-direction bus only.	Fail	<ul style="list-style-type: none"> • Does not correspond to scale of the problem.
TRAFFIC CALMING ON GEDDES/FULLER			
22	Close Geddes/Fuller or feeder streets to Geddes/Fuller.	Fail	<ul style="list-style-type: none"> • Does not increase corridor throughput; • Does not promote the use of or provide alternative modes of transportation; • Does not correspond to scale of the problem.
23	Geometric alterations (e.g., traffic circles, curved alignments).	Fail	<ul style="list-style-type: none"> • Does not increase corridor throughput; • Does not promote the use of or provide alternative modes of transportation; • Does not correspond to scale of the problem.
INTERSECTION IMPROVEMENTS			
24	Signal optimization at Huron Parkway/Fuller, and any along Geddes/Fuller Corridor; potential progression along Geddes/Fuller, Dixboro, and Huron River Drive.	Pass	Used for Alternatives 3A, 3B, 5, and 6; refer to Table 5.

TABLE 4
SCREEN 1 ANALYSIS RESULTS (Continued)

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
25	Signalize existing non-signalized intersections at Glazier/Fuller, Huron Parkway/Glazier, and any required on Dixboro and Huron River Drive.	Pass	Used for Alternatives 3A, 3B, 5, and 6; refer to Table 5.
26	Lengthen or increase number of turn lanes (widening at intersections).	Pass	Used in combination with other strategies for Alternatives 3A, 3B, 5 and 6.
BICYCLE FACILITIES			
27	Area-wide bicycle promotional program.	Pass	Used in Alternative 1; refer to Table 5.
28	Bicycle path identification, development, and implementation of bicycle plan.	Pass	Used in Alternative 1; refer to Table 5.
PEDESTRIAN FACILITIES			
29	Area-wide pedestrian paths along Glazier/Fuller.	Pass	Used in Alternative 1; refer to Table 5.
30	Site-specific pedestrian movement strategies (e.g., shuttle bus, people mover, grade separations, covered walkways, etc.) for specific site.	Pass	Used in Alternative 2; refer to Table 5.
III. INTELLIGENT VEHICLE-HIGHWAY SYSTEMS			
31	Traffic surveillance on Geddes/Fuller, Washtenaw, Plymouth, Dixboro, etc., with information dissemination.	Pass	Used in Alternative 4; refer to Table 5.
32	Use of changeable message signs with parking information, delays (to be placed along U.S. 23 and other specific sites).	Pass	Used in Alternative 4; refer to Table 5.
33	Use of Smart kiosks at U. of Michigan, VA Hospital, and at park-and-ride lots.	Pass	Used in Alternative 1 and 4; refer to Table 5.

**TABLE 4
SCREEN 1 ANALYSIS RESULTS (Continued)**

No.	Alternative Strategy	Pass/Fail 1st Screening	Reason for Failure or Comment
34	Use of Smart buses on Geddes/ Fuller, Washtenaw, Plymouth, and Conrail right-of-way.	Pass	Used in Alternative 1; refer to Table 5.
IV. DO NOTHING / NO BUILD			
35	Do nothing/no-build.	Fail	<ul style="list-style-type: none"> • Does not promote the use of or provide alternate modes of transportation; • Does not increase corridor throughput; • Not consistent with community goals and objectives.

**Table 5
Universe of Strategies for Ann Arbor Alternatives**

No.	STRATEGY	ALTERNATIVE							
		Alt. 1 TDM/TSM	Alt. 2 1-Lane Busway	Alt. 3A 1 HOV - CONRAIL	Alt. 3B Toll SOV CONRAIL	Alt. 4 IVHS	Alt. 5 1-Lane HOV on G/F	Alt. 6 Improve G/F	Alt. 7 Widen G/F
(1)	1 Lane HOV, Toll SOVs				○				
(2)	2 Lane HOV, Toll SOVs								
(3)	Parking Mgmt. & Restrictions	○							
(4)	Route Diversions								
(5)	Rideshare	○							
(6)	1 Rev. HOV Lane in Med. on G/F						○		
(7)	1 HOV Lane per Dir. on G/F								
(8)	1 HOV Lane per Dir. on Huron Pkwy. w/ 1 Rev. HOV Lane in Med. on Glacier					○			
(9)	1 HOV Lane Rev. on Washtenaw					○			
(10A)	1 HOV Lane per Dir. on Plymouth					○			
(10B)	1 HOV Lane Rev. on Plymouth								
(11)	1 HOV Lane Rev. on Huron R. Dr.								
(12)	One Rev. HOV Lane on CONRAIL			○					
(13)	2 HOV Lanes on CONRAIL								
(14)	Increased Bus Freq. & Service	○							
(15)	Express Bus with Feeder Buses	○	○						
(16)	Bus Shelters	○							
(17)	Widen Roadway						○	○	
(18)	One-Way Pair (G/F/G)								
(19)	Park & Ride w/ Bus Transfer	○	○						
(20)	1 Lane Rev. Guided Busway		○						
(21)	2 Lane, 2-Dir. Guided Busway								
(22)	Turning Restrictions								
(23)	Geometric Alterations								
(24)	Signal Optimization / Progression			○	○		○	○	
(25)	Signalize Non-Sig. Intersections			○	○		○	○	
(26)	Turn Lanes, Channelize, Widen Intrsects			○	○		○	○	
(27)	Bicycle Promotional Program	○							
(28)	Bicycle Path Delineation	○							
(29)	Ped. Sidewalks with Easment	○							
(30)	Ped. Movement Strategies		○						
(31)	Traffic Surveillance on G/F					○			
(32)	CMS with Parking Info along G/F					○			
(33)	Smart Kiosks					○			
(34)	Smart Buses on G/F	○							
(35)	Do Nothing								○

= Passed First Screening
 = Failed First Screening

○ Indicates that the strategy is included with the alternative