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DETROIT RIVER INTERNATIONAL CROSSING STUDY

PIOH #3

Workshop - Access Road Alternatives

April 11, 2006

Agenda

1. Opening Remarks/Introduction
2. Public Input from PIOH 3
3. How We Got Here
4. Tunnelling
6. Access Road Alternatives
7. Air Quality Impact Assessment
8. Noise / Vibration Impact Assessment
9. MTO Property Acquisition Process
10. Questions & Comments
11. Closing Remarks

1. Opening Remarks/Introduction

2. Public Input Received at PIOH #3 Sessions

Public Input Received at PIOH #3 Sessions

PIOH 3 Total Sign-ins: 812
Comment Sheets Completed: 214

Common Themes

- Illustrative Alternatives Evaluation Process; Consideration of Other Alternatives; Travel Demand;
- Consider Tunnel Options;
- Impacts of Alternatives to the Area Communities; Protecting Community Features;
- Safety; Emergency Access;
- Air Quality and Noise Impacts.

3. How We Got Here/Area of Continued Analysis

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The Border Transportation Partnership

Canada

U.S. Department of Transportation
Federal Highway Administration

Ontario

MDOT
Michigan Department of Transportation

Purpose of the DRIC Study

To provide for the safe, efficient and secure movement of people and goods across the Canadian-U.S. border in the Detroit River area to support the economies of Ontario, Michigan, Canada and the U.S.

In order to meet the purpose, this study must address the following regional transportation and mobility needs:

- Provide new border crossing capacity to meet increased long-term travel demand;
- Improve system connectivity to enhance the continuous flow of people and goods;
- Improve operations and processing capabilities at the border; and
- Provide reasonable and secure crossing options (i.e. network redundancy)

Given the importance of this trade corridor to the local, regional and national economies and recognizing the negative effects associated with poor traffic operations and congestion, the partnering governments must take all reasonable steps to reduce the likelihood of disruption to transportation service in this corridor.

Key Milestones

Study Area Features, Opportunities & Constraints	April '05	Initial Public Outreach
Initial Set of Crossing Alternatives, Plaza Locations & Connecting Routes in Canada and the U.S.	June '05	PIOH1
Area of Continued Analysis	December '05	PIOH2
Specific Crossing, Plaza and Access Road Options	March '06	PIOH3
Results of Social, Economic, Environmental and Engineering Assessments	December '06	PIOH4
Preferred Crossing Location, Plaza Locations & Connecting Routes in Canada and the U.S.	Spring '07	PIOH5
Finalize Engineering and Mitigation Measures	Summer '07	PIOH6
Document Study and Submit for Approvals	End of '07	Public Review

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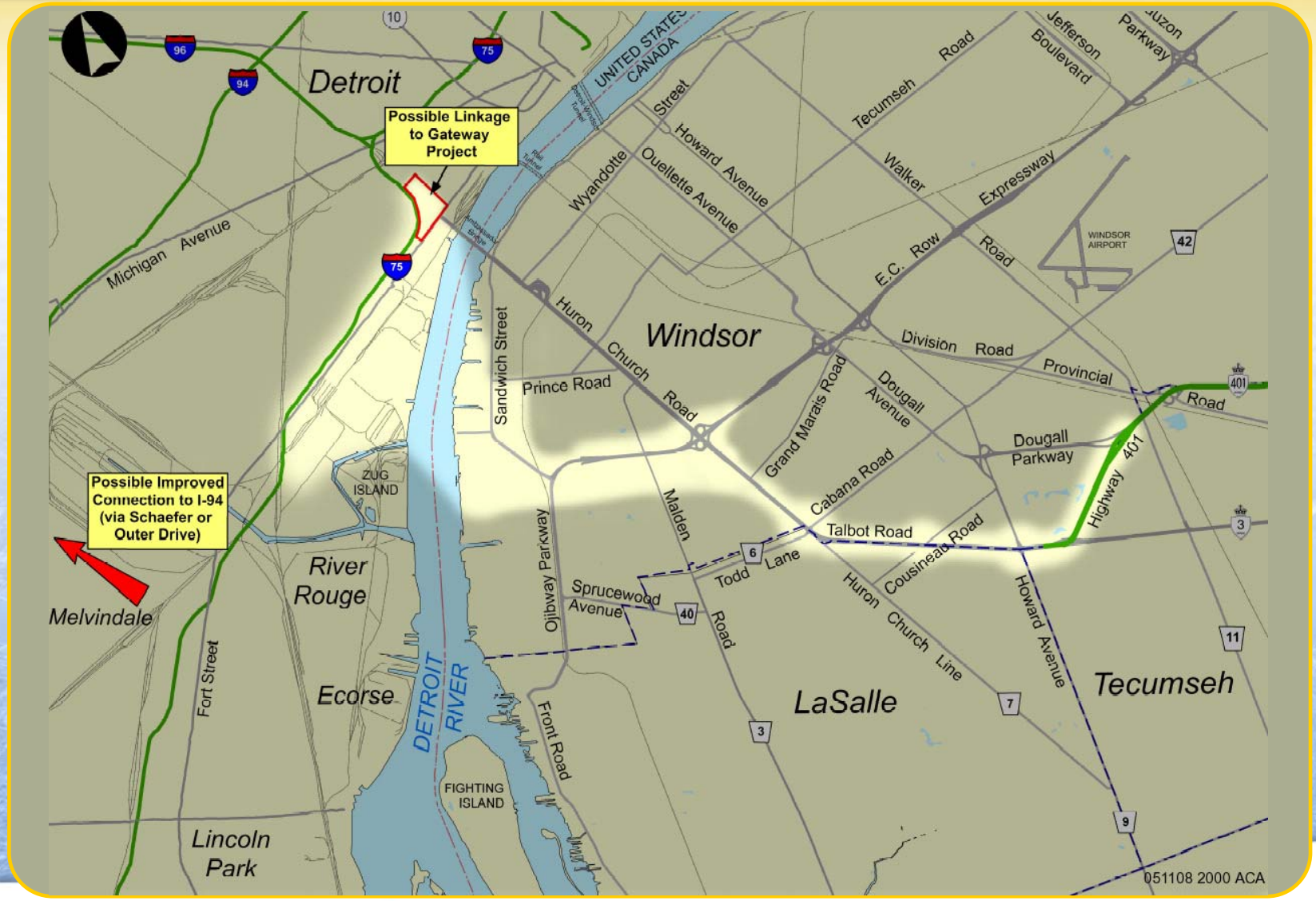
Area of Continued Analysis (ACA)



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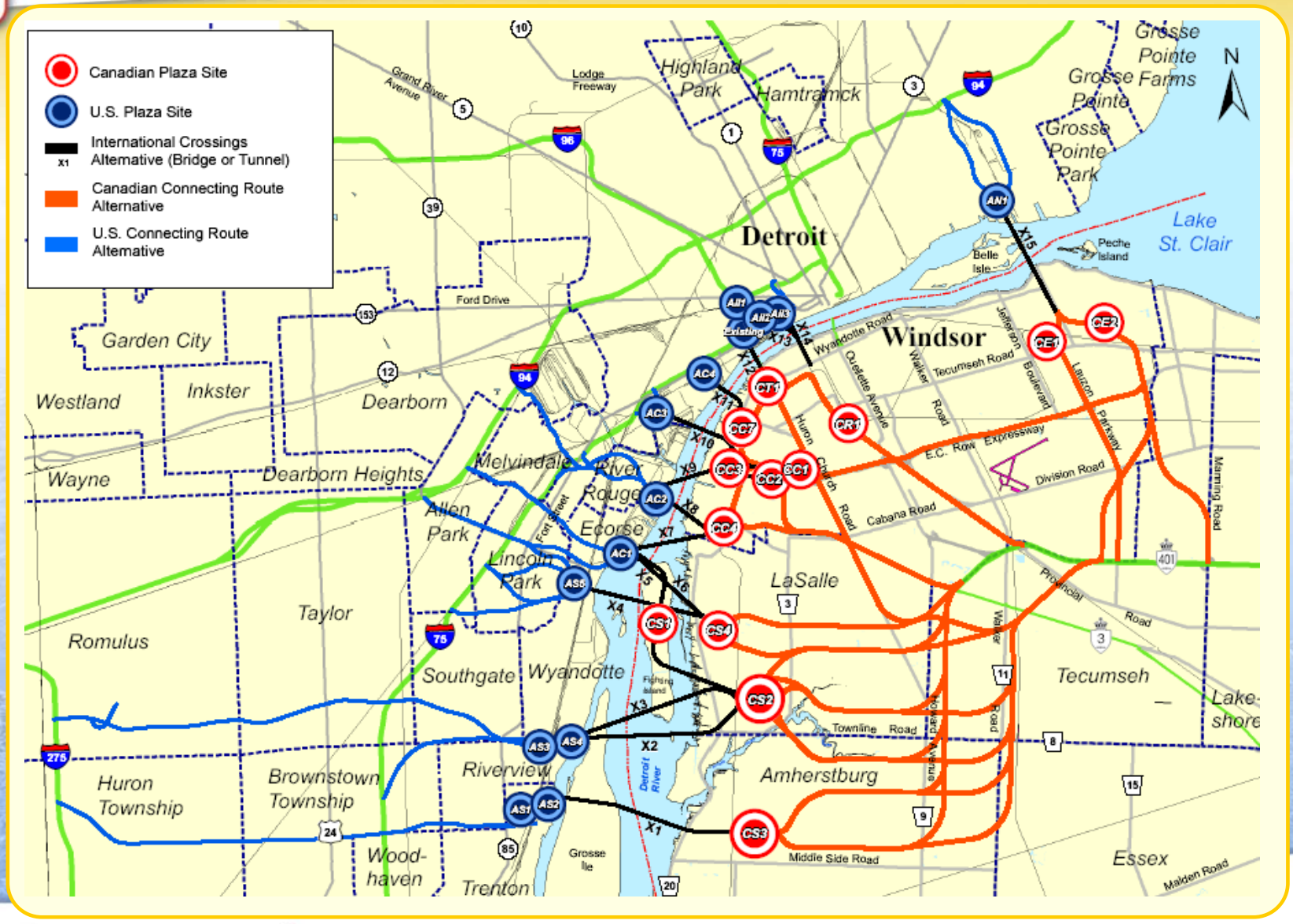
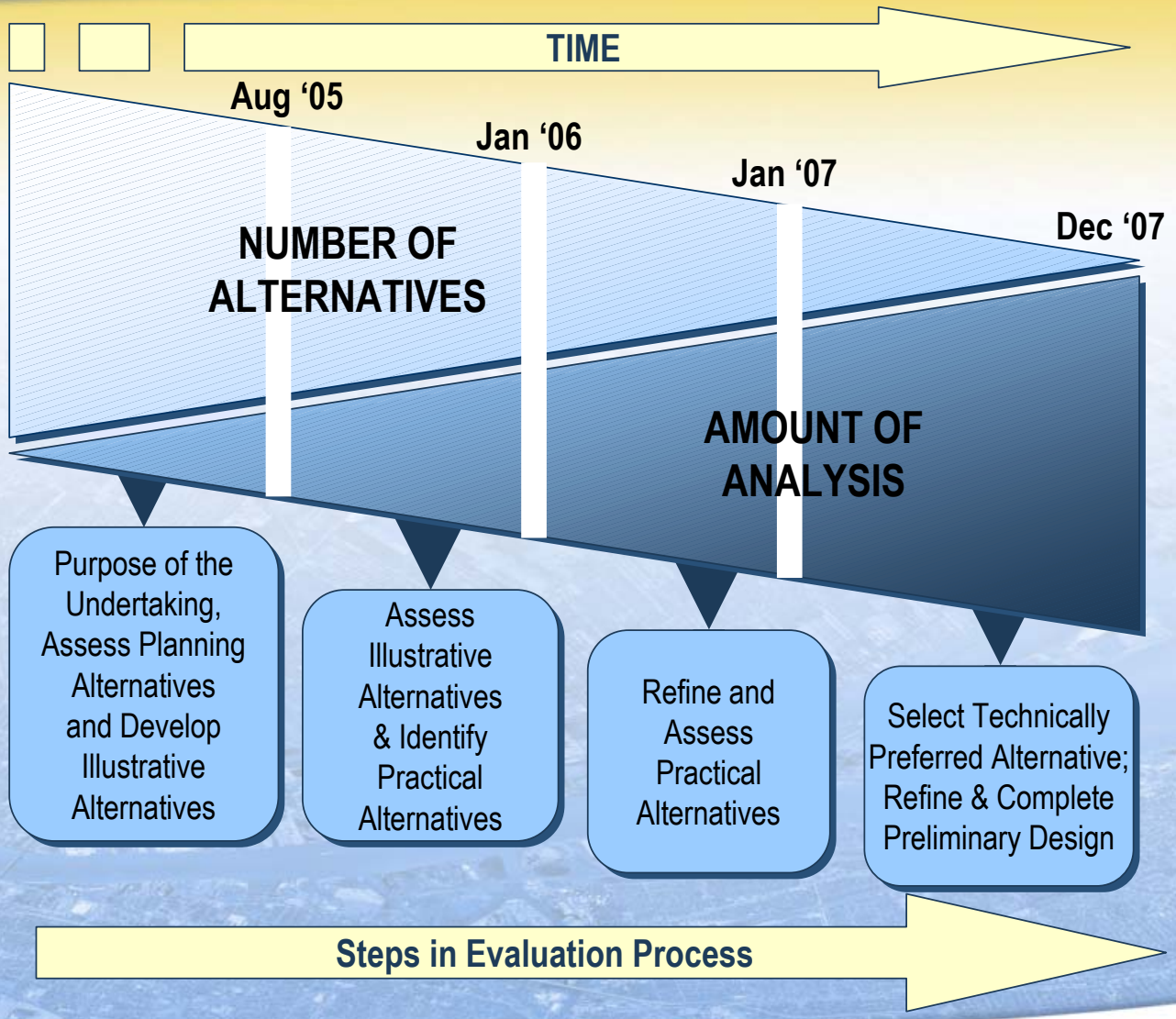
Illustrative Alternatives



Evaluation Process

The underlying principle for the alternatives generation and evaluation process is to start with a broad perspective and become more focused/ detailed as the project progresses.



Evaluation Factors

- Changes to Air Quality
- Protection of Community and Neighbourhood Characteristics (includes assessment of residential and business property impacts, impacts to noise levels, access and community features)
- Consistency with Existing & Planned Land Use
- Protection of Cultural Resources (includes parks, historic sites and areas of archaeological significance)
- Protection of Natural Environment (includes plant and animal species and habitat features)
- Improve Regional Mobility
- Minimize Cost (includes assessment of constructability issues).

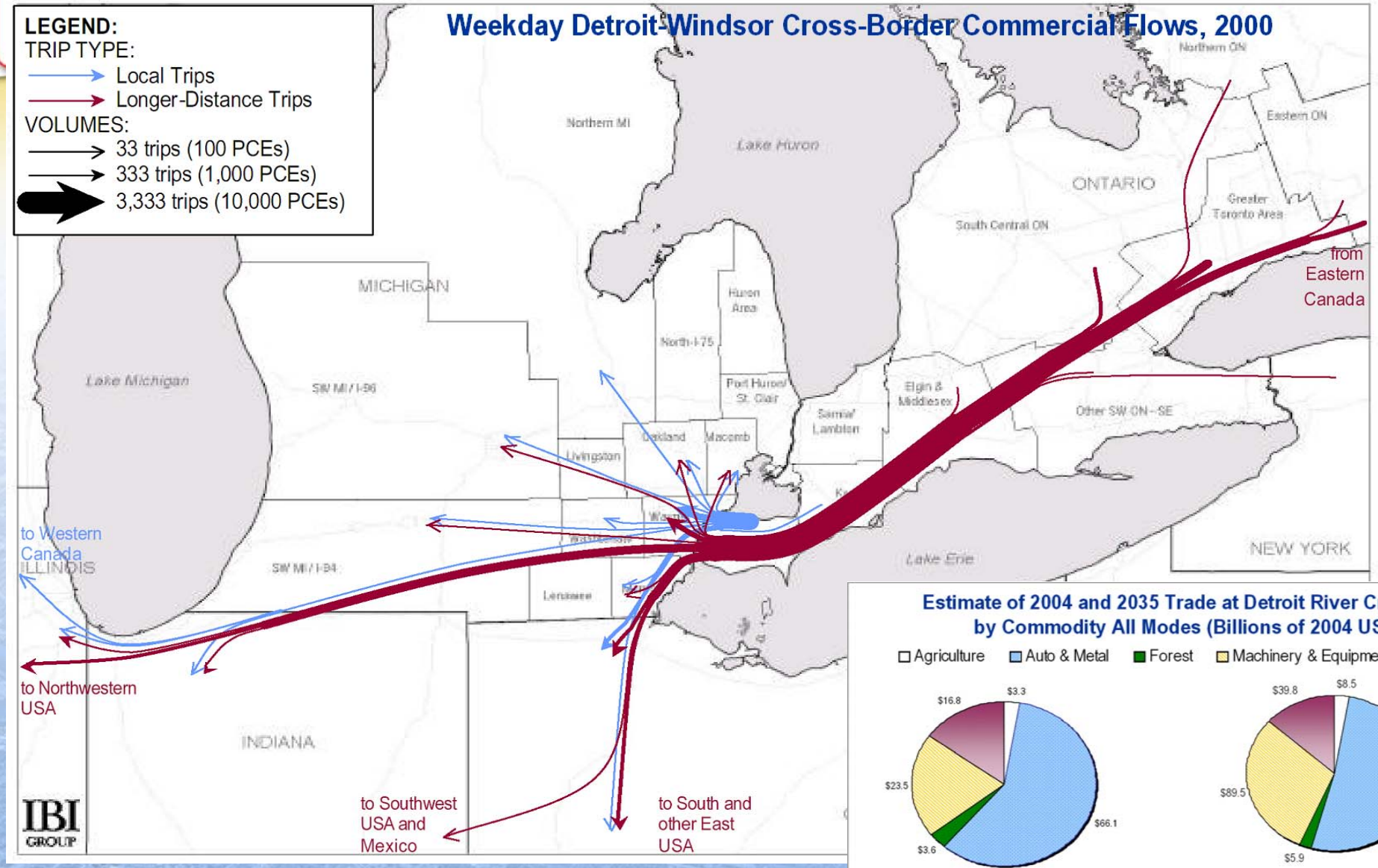
Factor Weighting Results

Factor	Project Team		Public		CCG	
	Rating	Weight (%)	Avg. Rating* (reflects 60 responses received)	Weight (%)	Avg. Rating (reflects 15 responses received)	Weight (%)
Changes in Air Quality	70	12.39	85	17.31	91	17.30
Protection of Community & Neighbourhood Characteristics	90	15.93	80	15.49	73	13.88
Maintain Consistency with Existing & Planned Land Use	70	12.39	62	12.89	72	13.69
Protection of Cultural Resources	70	12.39	66	13.14	69	13.12
Protection of Natural Environment	90	15.93	78	16.34	90	17.11
Improve Regional Mobility	100	17.70	76	15.28	78	14.83
Minimize Cost	75	13.27	47	9.54	53	10.07
		100		100		100

Mobility Needs - Passenger Traffic

Trip Type	Crossing					
	Ambassador Bridge		Detroit-Windsor Tunnel		Detroit River Crossings	
	Volume	%	Volume	%	Volume	%
LOCAL to LOCAL	13,450	71	15,000	88	28,450	79
LOCAL (Southeast Michigan) to/from LONG-DISTANCE (beyond Windsor-Essex)	1,850	10	900	5	2,700	8
LOCAL (Windsor-Essex) LONG-DISTANCE (beyond Southeast Michigan)	1,700	9	900	5	2,600	7
LONG-DISTANCE to LONG-DISTANCE	1,800	10	150	0.9	2,000	6
OTHER	70	0.4	50	0.3	120	0.3
TOTAL TRIPS	18,850	100	17,000	60	38,850	100

Weekday Detroit-Windsor Cross-Border Commercial Flows, 2000



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Mobility Needs - Commercial Traffic

Trip Type	Crossing					
	Ambassador Bridge		Detroit-Windsor Tunnel		Detroit River Crossings	
	Volume	%	Volume	%	Volume	%
LOCAL to LOCAL	2,100	71	350	59	2,450	19
LOCAL (Southeast Michigan) to/from LONG-DISTANCE (beyond Windsor-Essex)	1,950	16	100	19	2,100	16
LOCAL (Windsor-Essex) to/from LONG-DISTANCE (beyond Southeast Michigan)	1,750	14	100	15	1,850	14
LONG-DISTANCE to LONG-DISTANCE	6,450	52	50	6	6,500	50
OTHER	130	1.0	5	0.8	130	1.0
TOTAL TRIPS	12,400	100	600	100	13,000	100

Evaluation Results

- **South Alternatives**
  - Underutilized new crossing
  - Existing crossings and approach roads remain congested in the long-term
  - Impacts on U.S. side

- **Not a practical long-term solution**

Evaluation Results

- **East Alternatives**
  - Underutilized new crossing
  - Existing crossings and approach roads remain congested in the long-term
  - North of E.C. Row
    - Impacts to community cohesion and character
    - Inconsistency with existing/future land use
  - Impacts on U.S. side

- **Not a practical long-term solution**

Evaluation Results

- **Rail Corridor**
  - As a two-lane truckway to refurbished rail tunnels:
    - inadequate capacity to meet the long term needs of the region
  - As a freeway with a new downtown crossing:
    - unacceptably high impacts to central and southern Windsor
    - not consistent with the City's plans and land uses.

- **Not a practical long-term solution**

Evaluation Results

- **Twinned Ambassador Bridge**
  - Impacts on community cohesion and character (including historical/cultural features)
    - In the area of the Plaza
    - On Huron Church North of E.C. Row
  - Construction staging risks and complexities
  - Limited ability to provide continuous /ongoing river crossing capacity
- **Not a practical long-term solution**
- U.S. customs plaza of the Ambassador Bridge included in the area of continued analysis

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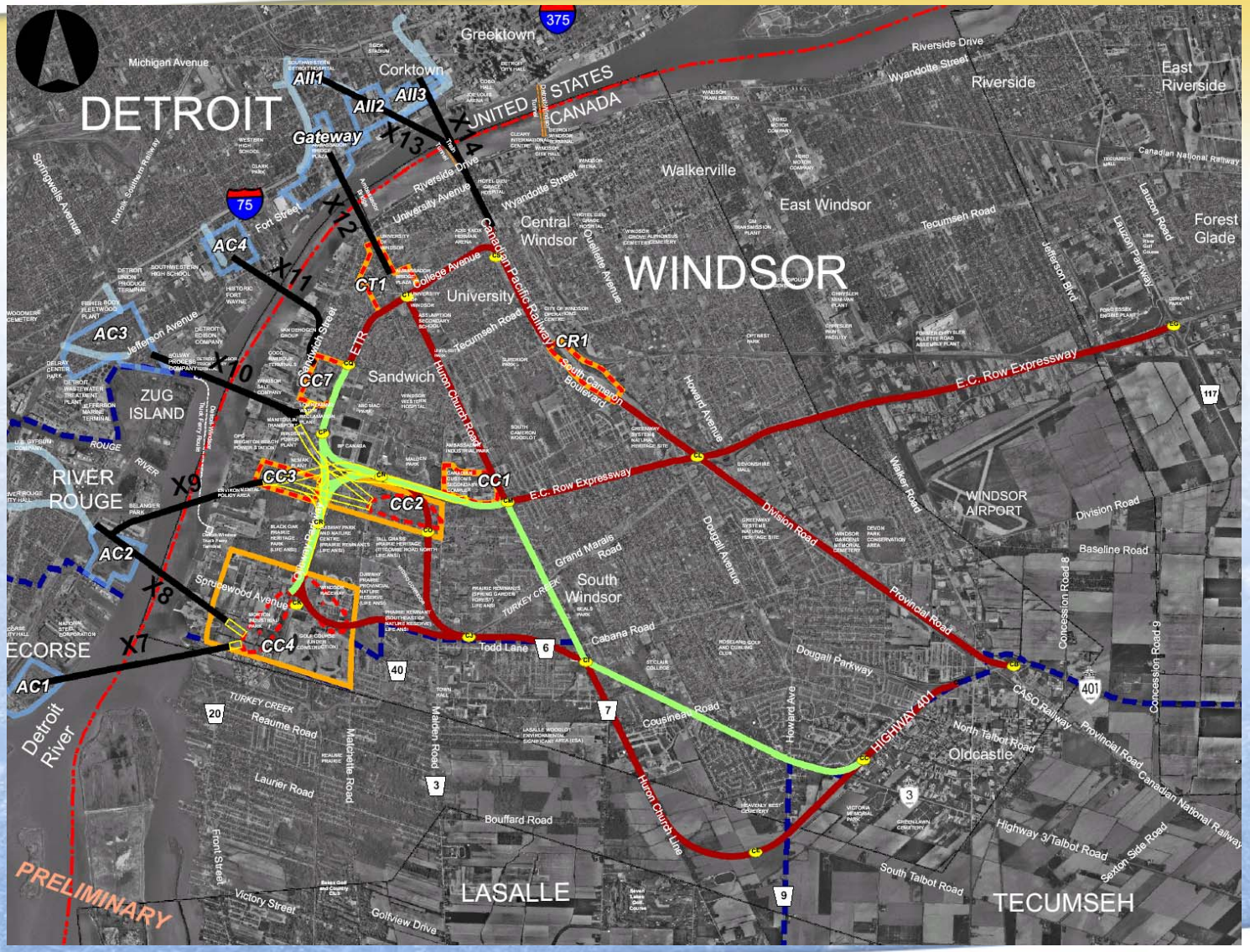
Evaluation Results



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Highway 3 By-Pass

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Highway 3 By-Pass Analysis

Factor	Highway 3 (Segment CC-CI)	Highway 3 Bypass (Segment CC-CE-CI)
Changes to Air Quality	No to Low impact on regional basis; 990+ households within 200 m (includes 90+ homes in planned developments)	No to Low impact on a regional basis; 915+ households within 200 m (includes 770+ homes in planned developments);
Community and Neighbourhood Impacts	**Displacements:** 95+ households 5+ Businesses **Disruption:** 990+ households within 200 m (includes 90+ homes in planned developments); 5 social features (e.g. schools, places of worship) **Community cohesion, character, function:** Currently significantly impacted due to high levels of existing traffic on Highway 3; impacts to a high number of residences **Overall high impact**	**Displacements:** 85+ households 5+ Businesses **Disruption:** 915+ households within 200 m (includes 770+ homes in planned developments); 7 social features (e.g. schools, places of worship) **Community cohesion, character, function:** Significant impact on current community and future community; existing community between Highway 3 and Huron Church Line would be 'encircled' two major roadways **Overall high impact**
Consistency with Land Use	Consistent as existing provincial highway and route to Ambassador Bridge; not consistent as freeway: Talbot Road runs along boundary of Windsor and LaSalle. Land use along this corridor includes institutional (St. Clair College), commercial and low density residential. Planned land use in LaSalle identifies Talbot Road corridor as transportation corridor; Windsor Gateway Study also identified Talbot Road as preferred route for access to new border crossing. **Overall moderate impact**	Not consistent with current/future residential community development: Significant urban planning implications for Town of LaSalle. Existing, planned and future urban development would need to be re-oriented with this option; a new roadway corridor by-passing Talbot Road would result in physical separation of Heritage Estates community from the rest of LaSalle. **Overall high impact**
Impacts to Cultural Resources	1 locally designated heritage site impacted **Overall, low impact**	No known significant archaeological sites impacted **Overall low impact; slightly preferred**

Highway 3 By-Pass Analysis

Factor	Highway 3 (Segment CC-CI)	Highway 3 Bypass(Segment CC-CE-CI)
Natural Environment	Impacts to edges of sensitive natural areas, notably the St. Clair College Prairie ESA and the Lennon Drain crossing **Displacements:** ESA[2] = 1.66 ha CNHS[3] = 2.92 ha SSH[4] = 3.62 ha **Areas of impact are considered relatively minor; overall low impact**	No direct impacts to ESA or CNHS; low impacts to other features **Displacements:** PNHF = 0.85 ha **Overall low impact; slightly preferred**
Improve Regional Mobility	Provides new freeway route; can separate int'l traffic and provide choice for local traffic Travel distance = 6.4 km **Overall low benefit**	Provides new freeway route; can separate int'l traffic and provide choice for local traffic ; Talbot Road available for local use Travel distance = 8.2 km **Overall low benefit**
Minimize Cost	Construction cost = $396 M Traffic management and detours required on Talbot Road and at Highway 3 interchange; relocation of municipal infrastructure in LaSalle and Windsor. **Overall low impact**	Construction cost = $447 M Traffic management and detours required on Huron Church Line and at Highway 3 interchange; relocation of municipal infrastructure in LaSalle **Overall low impact**

Summary of Assessment

- Both options provide similar benefits to regional mobility
- Both options have high impacts to community and neighbourhood features
- Highway 3 By-Pass option:
  - greater impacts to community characteristics
  - greater impacts to land use
  - slightly higher costs
  - slightly lower impacts to cultural and natural features

Highway 3 option is preferred.

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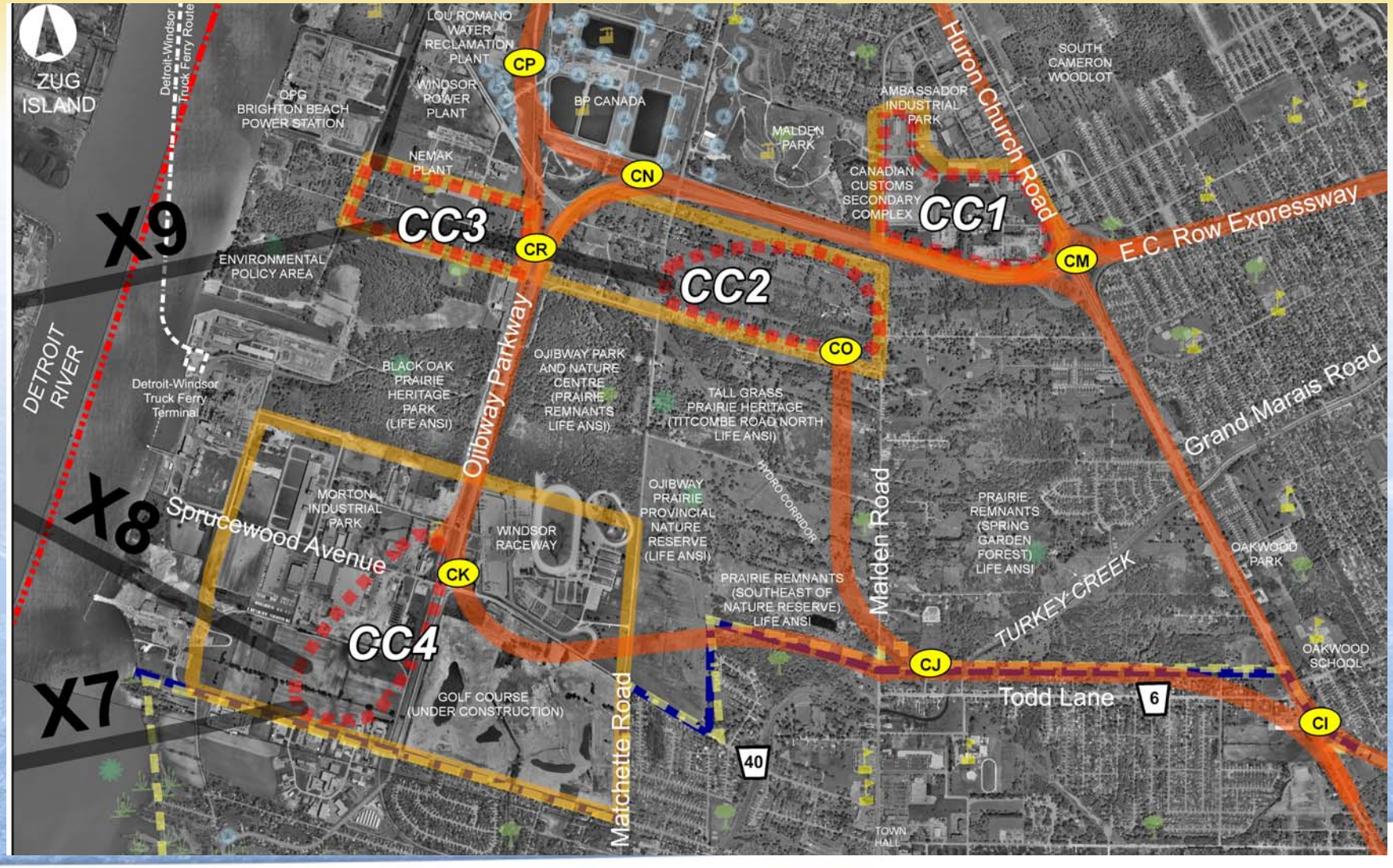
Arithmetic Evaluation – Highway 3 By-Pass

Project Team Weighting	Weighting	CC-CI-CM-CN-CR		CC-CI-CJ-CO		CC-CI-CJ-CK-CR	
		Score	Weight x Score	Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	12.39	3	37.17	3	37.17	3	37.17
Protect Community/ Neighborhood Characteristics	15.93	2	31.86	1	15.93	1	15.93
Maintain Consistency with Existing and Planned Land Use	12.39	2	24.78	1	12.39	1	12.39
Protect Cultural Resources	12.39	2	24.78	3	37.17	3	37.17
Protect the Natural Environment	15.93	2	31.86	1	15.93	1	15.93
Improve Regional Mobility	17.70	5	88.50	5	88.50	5	88.50
Minimize Cost	13.27	1	13.27	2	26.54	2	26.54
Total Weighted Score	100.00		252.22		233.63		233.63
Ranking			***1***		***2***		***2***

Public Weighting	Weighting	CC-CI-CM-CN-CR		CC-CI-CJ-CO		CC-CI-CJ-CK-CR	
		Score	Weight x Score	Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	17.32	3	51.96	3	51.96	3	51.96
Protect Community/ Neighborhood Characteristics	15.49	2	30.98	1	15.49	1	15.49
Maintain Consistency with Existing and Planned Land Use	12.89	2	25.78	1	12.89	1	12.89
Protect Cultural Resources	13.14	2	26.28	3	39.42	3	39.42
Protect the Natural Environment	16.34	2	32.68	1	16.34	1	16.34
Improve Regional Mobility	15.28	5	76.40	5	76.40	5	76.40
Minimize Cost	9.54	1	9.54	2	19.08	2	19.08
Total Weighted Score	100.00		253.62		231.58		231.58
Ranking			***1***		***2***		***2***

CCG Weighting	Weighting	CC-CI-CM-CN-CR		CC-CI-CJ-CO		CC-CI-CJ-CK-CR	
		Score	Weight x Score	Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	17.30	3	51.90	3	51.90	3	51.90
Protect Community/ Neighborhood Characteristics	13.88	2	27.76	1	13.88	1	13.88
Maintain Consistency with Existing and Planned Land Use	13.69	2	27.38	1	13.69	1	13.69
Protect Cultural Resources	13.12	2	26.24	3	39.36	3	39.36
Protect the Natural Environment	17.11	2	34.22	1	17.11	1	17.11
Improve Regional Mobility	14.83	5	74.15	5	74.15	5	74.15
Minimize Cost	10.07	1	10.07	2	20.14	2	20.14
Total Weighted Score	100.00		251.72		230.23		230.23
Ranking			***1***		***2***		***2***


ZUG ISLAND
Detroit-Windsor Truck Ferry Route
OPG BRIGHTON BEACH POWER STATION
LOU ROMANO WATER RECLAMATION PLANT
WINDSOR POWER PLANT
NEMAK PLANT
BP CANADA
MALDEN PARK
AMBASSADOR INDUSTRIAL PARK
SOUTH CAMERON WOODLOT
Huron Church Road
CANADIAN CUSTOMS SECONDARY COMPLEX
CP
CN
CR
CM
CO
CC1
CC2
CC3
CC4
X9
X8
X7
E.C. Row Expressway
ENVIRONMENTAL POLICY AREA
DETROIT RIVER
Detroit-Windsor Truck Ferry Terminal
BLACK OAK PRAIRIE HERITAGE PARK (LIFE ANSI)
OJIBWAY PARK AND NATURE CENTRE (PRAIRIE REMNANTS LIFE ANSI)
Ojibway Parkway
TALL GRASS PRAIRIE HERITAGE (TITCOMBE ROAD NORTH LIFE ANSI)
Grand Marais Road
MORTON INDUSTRIAL PARK
Sprucewood Avenue
WINDSOR RACEWAY
OJIBWAY PRAIRIE PROVINCIAL NATURE RESERVE (LIFE ANSI)
HYDRO CORRIDOR
Malden Road
PRAIRIE REMNANTS (SPRING GARDEN FOREST) LIFE ANSI
OAKWOOD PARK
CK
PRAIRIE REMNANTS (SOUTHEAST OF NATURE RESERVE) LIFE ANSI
TURKEY CREEK
CJ
OAKWOOD SCHOOL
Todd Lane
6
CI
GOLF COURSE (UNDER CONSTRUCTION)
Matchette Road
40
TOWN HALL

Huron Church/Ojibway Options

Factor	Highway 3/Huron Church/EC Row (Segment CC-CI-CM-CN-CR)	Highway 3/Todd Lane/Malden Road/EC Row (Segment CC-CI-CJ-CO-CR)	Highway 3/Todd Lane/Ojibway Parkway (Segment CC-CI-CJ-CK-CR)
Changes to Air Quality	Overall no to low impact on a system-wide basis; 1370+ households within 200 m	Overall no to low impact on a system-wide basis; 1225+ households within 200 m	Overall no to low impact on a system-wide basis; 1165+ households within 200 m
Community and Neighbourhood Impacts	**Displacements:** 130+ households 35+ Businesses **Disruption:** 1370+ households within 200 m; 10 social features (e.g. schools, places of worship) **Cohesion and Character:** The Highway 3 segment is common to all three alternatives; This alternative largely follows the existing transportation corridor formed by Huron Church Road/EC Row Expressway/Ojibway Parkway; moderate impact on community cohesion and character. **Overall moderate impact**	**Displacements:** 115+ households 10- Businesses **Disruption:** 1225+ households within 200 m; 7 social features (e.g. schools, places of worship) **Cohesion and Character:** The Highway 3 segment is common to all three alternatives; a new transportation corridor paralleling Todd Lane/Malden Road would sever residential areas from adjacent natural areas and impact highly valued community natural areas/open space; significant impact on community cohesion and character. **Overall high impact**	**Displacements:** 120+ households 10+ Businesses **Disruption:** 1165+ households within 200 m; 7 social features (e.g. schools, places of worship) **Cohesion and Character:** The Highway 3 segment is common to all three alternatives; a new transportation corridor paralleling Todd Lane/Sprucewood Ave. would sever residential areas from adjacent natural areas and impact highly valued community natural areas/open space; significant impact on community cohesion and character. **Overall high impact**
Consistency with Land Use	Consistent as existing route to Ambassador Bridge; not consistent as freeway Option utilizes existing transportation corridors, reducing impacts to current and future land uses in this area of the City compared to the other options **Overall moderate impact**	Highway 3 section consistent as existing use to Ambassador Bridge, not consistent as freeway; New route through Spring Garden Planning Area not consistent with existing and planned land use; A new route is also not consistent with federal or provincial land use initiatives in this area to protect and perpetuate special and protected species and habitat in this area. **Overall high impact**	Highway 3 section consistent as existing use to Ambassador Bridge, not consistent as freeway; New route through Spring Garden Planning Area and Ojibway/Black Oak Natural Heritage Areas not consistent with existing and planned land use; A new route is also not consistent with federal or provincial initiatives in this area to protect and perpetuate special and protected species and habitat in this area. **Overall high impact**

Huron Church/Ojibway Options

Factor	Highway 3/Huron Church/EC Row (Segment CC-CI-CM-CN-CR)	Highway 3/Todd Lane/Malden Road/EC Row (Segment CC-CI-CJ-CO-CR)	Highway 3/Todd Lane/Ojibway Parkway (Segment CC-CI-CJ-CK-CR)
Impacts to Cultural Resources	1 locally designated Heritage site; 2 known significant archaeological sites impacted **Overall moderate impact**	1 locally designated Heritage site; no known significant archaeological sites impacted **Overall low impact**	1 locally designated Heritage site; 1 known significant archaeological site impacted **Overall low impact**
Natural Environment	**Displacements:** ANSI = 0.49 ha ESA = 2.54 ha CNHS = 10.10 ha SSH = 10.98 ha **Disruptions:** (i.e. within 500m of ROW) ANSI = 31.06 ha ESA = 52.48 ha CNHS = 214.76ha **Overall moderate impact to designated features**	**Displacements:** ANSI = 16.94 ha ESA = 23.68 ha CNHS = 28.5 ha SSH = 32.44 ha **Disruptions:** (i.e. within 500m of ROW) ANSI = 125.31 ha ESA = 151.72 ha CNHS = 184.63 ha **Overall high impact to designated features**	**Displacements:** ANSI = 23.14 ha ESA = 30.14 ha CNHS = 21.7 ha SSH = 35.43 ha **Disruptions:** (i.e. within 500m of ROW) ANSI = 198.41 ha ESA = 219.54 ha CNHS = 131.99 ha **Overall high impact to designated features**
Improve Regional Mobility	Provides new freeway route; can separate int'l traffic and provide choice for local traffic; Utilizes existing key links in local network for int'l traffic Travel distance = 12.5 km Considered overall low benefit to regional mobility as this is only the access road portion	Provides new freeway route; can separate int'l traffic and provide choice for local traffic; Huron Church Road available for local use Travel distance = 12.7 km Considered overall low benefit to regional mobility as this is only the access road portion; slightly preferred over HCR/EC Row option	Provides new freeway route; can separate int'l traffic and provide choice for local traffic Huron Church Road available for local use Travel distance = 12.2 km Considered overall low benefit to regional mobility as this is only the access road portion; slightly preferred over HCR/EC Row option
Cost	Construction Cost = $759 M Traffic staging required along complete length; existing interchanges on HCR/Talbot Rd at Highway 3 and E.C. Row will require reconfiguration; reconstruction of west end of EC Row assumed; detours at crossing roads/intersections may be required; relocation of utilities and municipal infrastructure required **Overall high impact**	Construction Cost = $651 M Traffic staging required along Talbot Road section; existing interchange on HCR/Talbot Rd at Highway 3 will require reconfiguration; reconstruction of portion of EC Row assumed; detours at crossing roads/intersections may be required; relocation of utilities and municipal infrastructure required **Overall moderate impact**	Construction Cost = $606 M Traffic staging required along Talbot Road section and Ojibway Parkway section; existing interchange on HCR/Talbot Rd at Highway 3 will require reconfiguration; detours at crossing roads/intersections may be required; relocation of utilities and municipal infrastructure required relocation of utilities and municipal infrastructure required **Overall moderate impact**

Summary of Assessment

- All three options have high community impacts with similar direct/indirect impacts to residential areas

- Huron Church/EC Row option:
  - higher impacts to businesses
  - greater impacts to cultural features
  - slightly lower benefits to regional mobility
  - greater construction costs and more complex construction
  - lower impacts to community characteristics
  - lower impacts to land use
  - lower direct/indirect impacts to natural features west of Huron Church

Overall, the advantages of Huron Church/EC Row option were considered to be more significant than the disadvantages

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Project Team Weighting	Weighting	CC-CI		CC-CE-CI	
		Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	12.39	3	37.17	3	37.17
Protect Community/ Neighborhood Characteristics	15.93	1	15.93	1	15.93
Maintain Consistency with Existing and Planned Land Use	12.39	2	24.78	1	12.39
Protect Cultural Resources	12.39	3	37.17	3	37.17
Protect the Natural Environment	15.93	3	47.79	3	47.79
Improve Regional Mobility	17.70	5	88.50	5	88.50
Minimize Cost	13.27	3	39.81	3	39.81
Total Weighted Score	100.00		291.15		278.76
Ranking			***1***		***2***

Public Weighting	Weighting	CC-CI		CC-CE-CI	
		Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	17.32	3	51.96	3	51.96
Protect Community/ Neighborhood Characteristics	15.49	1	15.49	1	15.49
Maintain Consistency with Existing and Planned Land Use	12.89	2	25.78	1	12.89
Protect Cultural Resources	13.14	3	39.42	3	39.42
Protect the Natural Environment	16.34	3	49.02	3	49.02
Improve Regional Mobility	15.28	5	76.40	5	76.40
Minimize Cost	9.54	3	28.62	3	28.62
Total Weighted Score	100.00		286.69		273.80
Ranking			***1***		***2***

CCG Weighting	Weighting	CC-CI		CC-CE-CI	
		Score	Weight x Score	Score	Weight x Score
Changes in Air Quality	17.30	3	51.90	3	51.90
Protect Community/ Neighborhood Characteristics	13.88	1	13.88	1	13.88
Maintain Consistency with Existing and Planned Land Use	13.69	2	27.38	1	13.69
Protect Cultural Resources	13.12	3	39.36	3	39.36
Protect the Natural Environment	17.11	3	51.33	3	51.33
Improve Regional Mobility	14.83	5	74.15	5	74.15
Minimize Cost	10.07	3	30.21	3	30.21
Total Weighted Score	100.00		288.21		274.52
Ranking			***1***		***2***

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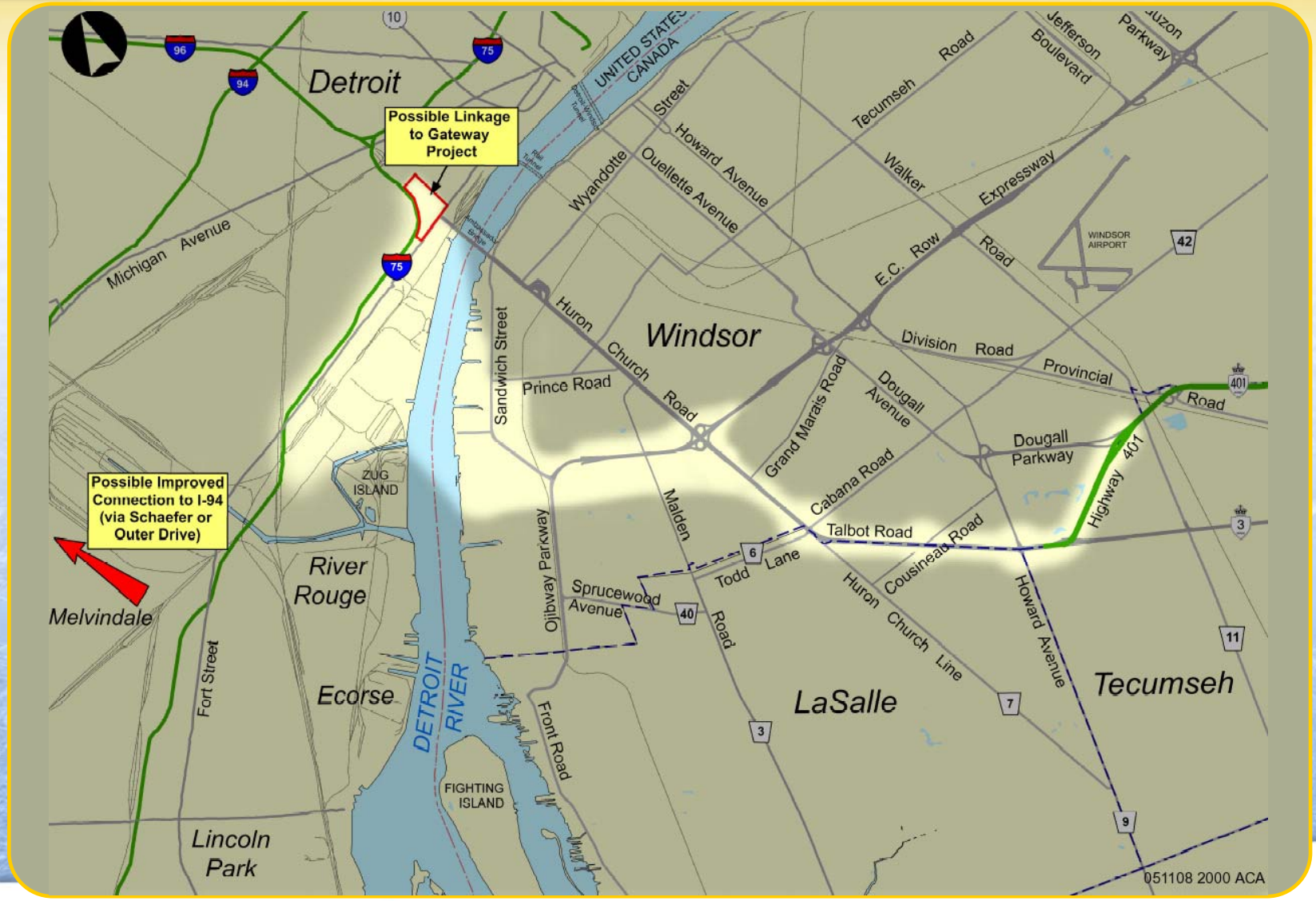
Area of Continued Analysis (ACA)



Next Steps

Consultation with Municipalities, Agencies, First Nations Interest Groups and U.S. Project Team	**Ongoing**
Obtain Comments on Crossing, Plaza and Access Road Options	**March - April '06**
PIOH3 Meeting at Ciociaro Club	March 28
PIOH3 Meeting at Novelletto Rosati Complex	March 30
Workshop at Ciociaro Club *(Please Register to Attend)*	April 11
Workshop at Novelletto Rosati Complex *(Please Register to Attend)*	April 12
Assess Options	**Spring/Summer '06**
Meetings to be scheduled for May, June and August	
Other meetings upon request	
Present Results of Assessment	**Nov./Dec. '06**
PIOH 4 and Workshops	To be Scheduled
Present Selection of Technically and Environmentally Preferred Alternative	**Spring '07**
PIOH5 and Workshops	

4. Tunneling

Bored Tunnels

- The layer of soft ground available for boring is generally 25 m to 30 m, which is not thick enough for a 3-lane bored tunnel.
  - Bored Tunnel Requirements:
    - Ground to top of tunnel 15m
    - Tunnel 15 m
    - Bottom of tunnel to bedrock 5m
- The new freeway would have some sub-standard shoulder areas
- Access/egress by ramps would be difficult because of tunnel depth
  - Constructability concerns at tunnel portals
  - Risks with respect to dewatering and groundwater
  - Risks with respect to stability
- Conclusion: Bored tunnels are not considered practical

Tunneling (Cont.)

Cut and Cover Tunnels

- Generally feasible at depths up to 15m. Special controls will be required at depths greater than 7m
- Risks with respect to dewatering and groundwater
- Complex construction staging may be required
- Conclusion: Tunneling using cut and cover techniques will be analyzed and evaluated.

Tunnels (Cont.) - Ventilation Buildings

Why is Tunnel Ventilation Required?

- A vehicle tunnel can be either **naturally ventilated** or **mechanically ventilated**. Tunnel ventilation is required to control:
  - air quality within a tunnel;
  - air emissions from the tunnel's entrance and exit portals; and,
  - fire and/or emergency conditions within the tunnel.

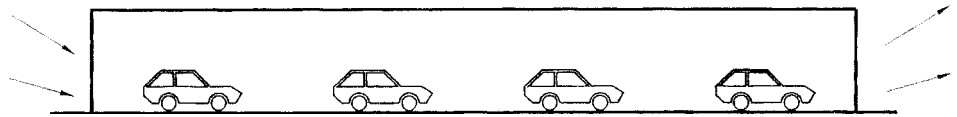
Ventilation Design Options

Naturally Ventilated Tunnels

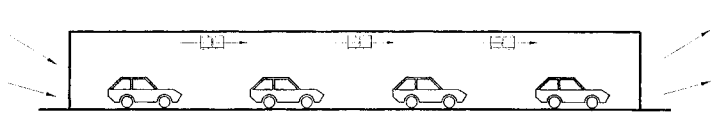
- For tunnels between 150 to 200 meters in length can be ventilated naturally. **Not considered practical for Access Road alternatives.**

Mechanically Ventilated Tunnels

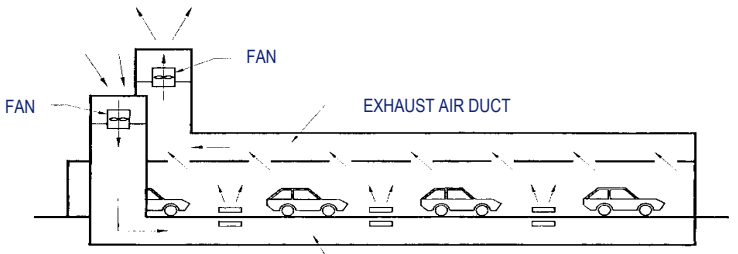
- Practical methods for the tunneled access road alternatives; could accommodate the 6 km tunnel length proposed for the alternatives.
- **Option 1 Longitudinal Ventilation** – 6 km tunnel would require approximately 300 jets; Suitable for low traffic volumes; Design issues include effectiveness of limiting portal emissions and fan noise; Examples include Cassier Tunnel, Vancouver.
- **Full Transverse Ventilation** – 6 km tunnel tunnel would require one large building or three smaller buildings; Design issues include noise, large land requirements but provides pollutant dispersal. Examples include Detroit-Windsor Tunnel.



Natural Ventilation



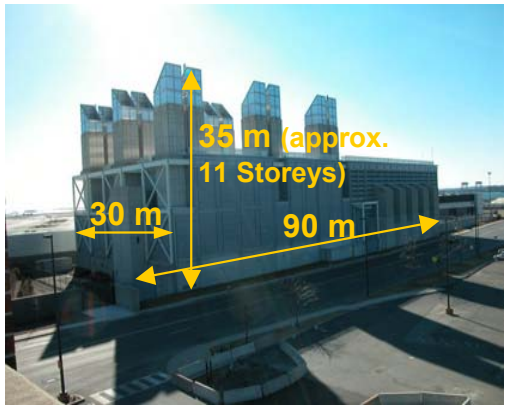
Longitudinal Ventilation with Jet Fans



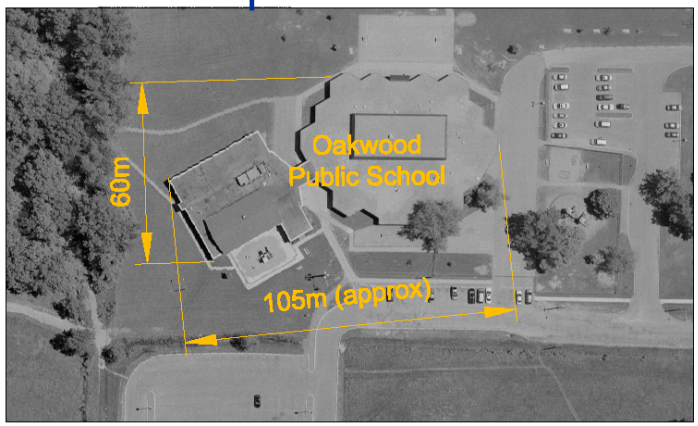
Full Transverse Ventilation

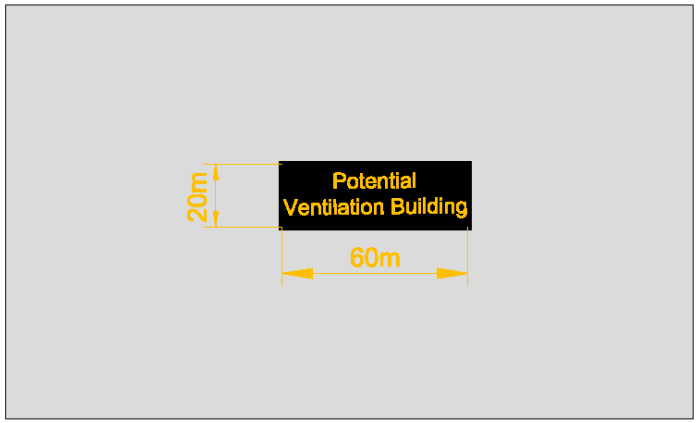
Tunnels (Cont.) - Ventilation Buildings

Scales of Ventilation Buildings



Size Comparison with Oakwood P.S.





Tunnels (Cont.) – Central Artery/Tunnel (The Big Dig), Boston

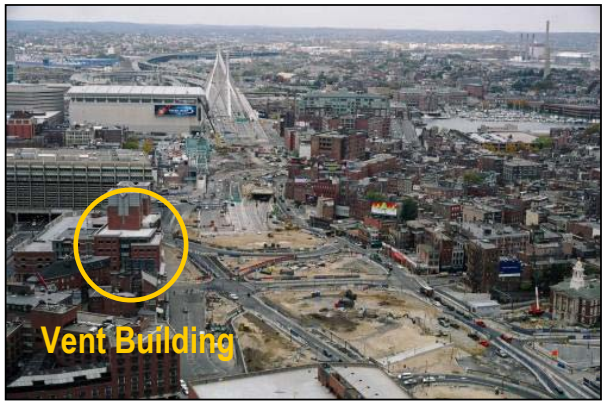
Context

- System-wide improvements to Boston's transportation network to address high traffic volumes. Major components consisting of transit, tunnel, above and at-grade highway projects through the city's core.

- Mitigation programs included extensive community consultation focusing on reducing impacts to affected neighborhoods
- Business and residential property impacts; structural impacts associated with construction
- Vent buildings constructed in corridor to expel vehicle exhaust from tunnel

Before - Central Artery as an elevated highway south of Charles River

After – At-grade road system above Central Artery tunnel



Tunnels (Cont.) – Central Artery/Tunnel (The Big Dig), Boston

Context Sensitive Solutions:

- Landscaping above Ted Williams Tunnel

- Parklands above Central Artery Tunnel

Tunnels (Cont.) – I-696, Michigan

Context

- 3 pedestrian plazas in an area of mixed residential, community, and commercial properties.

Purpose and Description

- Pedestrian plazas maintain connectivity within neighborhoods
- 3 pedestrian plazas (bridge decks), each approximately 700 feet wide, within a mile length.

Context Sensitive Solutions Approach

- Width of each plaza was determined by adjacent residential developments, established pedestrian paths
- No artificial ventilation would be required
- The bridge carrying Greenfield Road over the freeway was given extra wide pedestrian sidewalks
- A few isolated homes were purchased to increase park areas adjacent to the plazas.

Outcome

- The plaza surfaces are maintained by the cities of Oak Park and Southfield
- MDOT retains maintenance responsibility for the plaza structures.

5. Review and Refinements to Access Road Alternatives

6. Air Quality Impact Assessment

Consultation Feedback

- Air Quality is the #1 priority for Windsor residents
- Perception that air quality in Windsor is poor, and negatively affects their health
  - Specifically diesel exhaust from heavy trucks
- Concerned about increases in truck traffic and effect on air quality
- Residents want a tunnel to solve local air quality problems, among other reasons
  - Belief that a tunnel will reduce exhaust emissions

Current Air Quality

- Two active monitoring locations in Windsor
- Concentrations of most Criteria Air Contaminants (CACs – TSP, PM_{10}, $PM_{2.5}$, NO_x, SO_2, Ozone, CO) in Windsor generally below the MOE Ambient Air Quality Criteria (AAQCs)
- Exceptions are PM_{10}, $PM_{2.5}$ and Ozone
  - in excess of the criteria 14, 10 and 81 times per year respectively
- Fine particulate is released from vehicle exhaust and other industrial sources
- Small enough to penetrate deep into the lungs
  - Evolving science
- Highest concentrations measured in Sarnia
  - Concentrations in Windsor similar to Kitchener, Guelph and London
  - 50 – 90% due to long range, transboundary transport from U.S.

Current Air Quality

- Ozone is not released directly into the atmosphere;
  - formed through chemical reactions between NOx and VOCs in the presence of sunlight
- Port Stanley had the highest concentrations and most frequent exceedances in 2003
  - other rural areas along Lake Erie north shore also very high
  - due to transboundary transport from U.S. (50 – 90%)
- Concentrations in Windsor similar to Kitchener, Hamilton, London

Predicting Future Air Quality

- Use approved air pollutant emission models and air dispersion models
  - predict ambient concentration of air pollutants
  - Objective is to mimick reality
- Start with existing conditions
  - Model and compare to the ambient data
  - Reality check of how good we're doing
- Model the alternatives
  - 2015, 2025, 2035, for each alternative
  - Model "no build" conditions for each year
  - Compare predicted concentrations to standards and guidelines
- Compare to "no build" to determine change in air quality
  - Assess each alternative in comparison to one another

Predicting Future Air Quality

- Emissions Calculations and Air Dispersion Modelling Considerations
  - Use local meteorological data from Windsor Airport
  - Incorporate regulatory changes in fuels and engine technologies
  - Incorporate differences in Canadian and U.S. fuels and vehicles
  - Incorporate Canadian and U.S. fleet turnover rates

Predicting Future Air Quality: Practical Alternatives

- Assessment of Practical Alternatives will include both NO_x and $PM_{2.5}$
  - –Preferred alternative(s) will be assessed for 14 air contaminants
- Determine predicted concentrations in zones around ROW and at sensitive receptor locations (schools, residences, etc.)
  - –Assess changes to concentrations and frequency of exceedance (of standards and guidelines) in comparison to the “no build” conditions
  - –Assess mitigation measures (if required)
  - –Compare and score each alternative

7. Noise/Vibration Impact Assessment

8. Introduction to the MTO Property Acquisition Process

9. Questions & Comments

10. Closing Remarks