



McElhanney

Regional Transportation Model – Stakeholders Meeting Model Application and Key Findings

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Strategic Transportation Planning

Who Are We ?

- Basse Clement, Division Manager
 - +20 yrs. experience in transportation planning and modelling
 - 10 yrs. at TransLink, 10 yrs. in consulting
- Harvey Harrison, Senior Modeller/Planner
 - 12 yrs. experience in modelling and simulation
- Manvir Sohi, Senior Transportation Planner
 - 5 yrs. experience in transportation planning and modelling





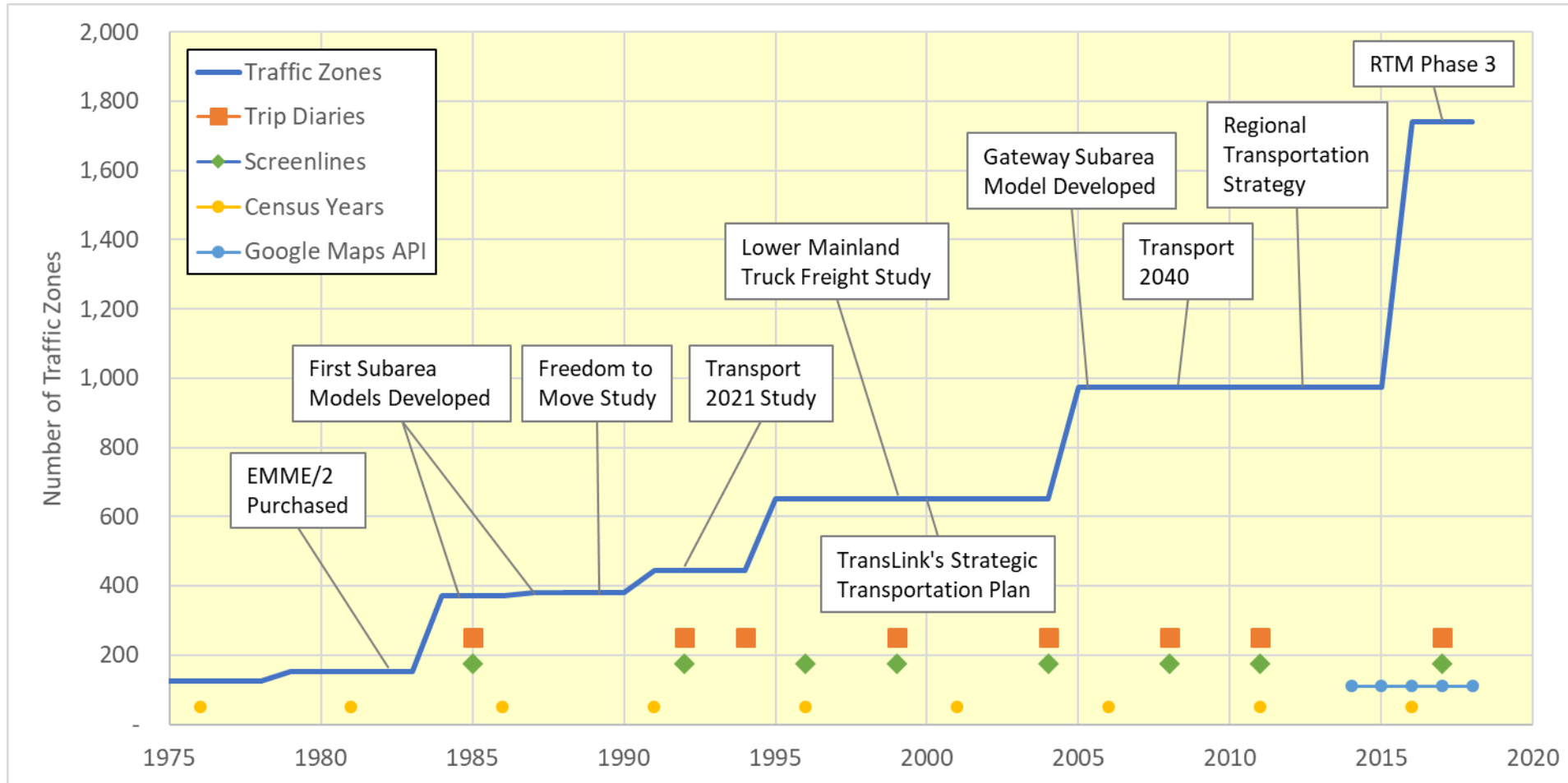
Presentation Outline

- History of RTM Application
- Project Examples:
 - Regional level application
 - Corridor level application
 - Neighbourhood level application
- For each example:
 - Project background/context
 - Problem statement – what were the key issues and questions that were asked
 - RTM3 model application
 - Outcomes and lessons learned
- Suggestions for Future Model Enhancements



History of RTM Development

- Metro Vancouver has had a regional EMME model since early 1980's

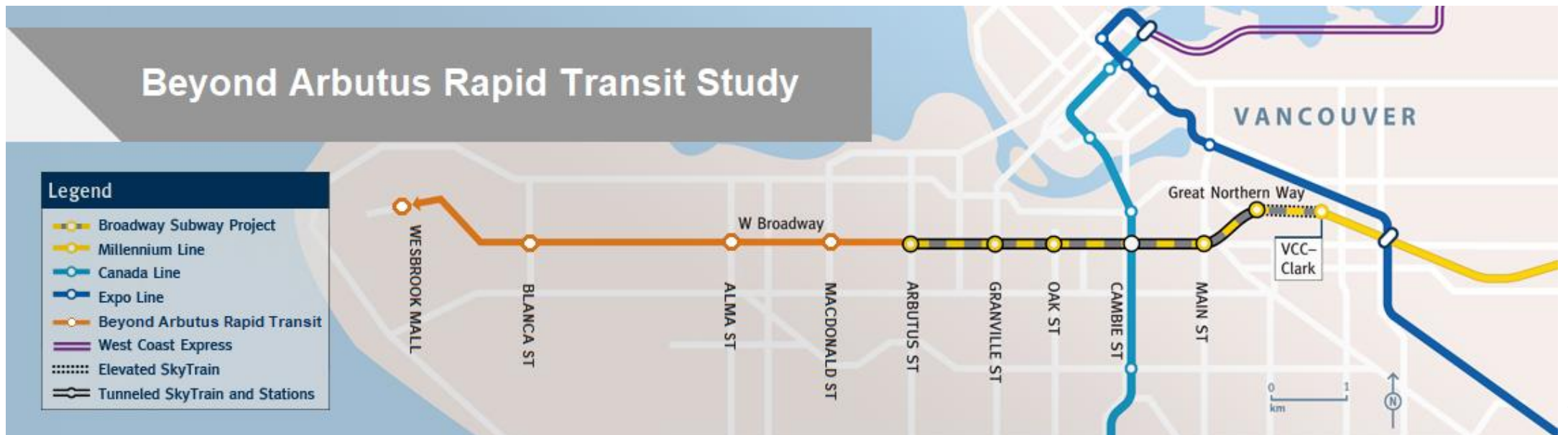




Corridor Level Application

Beyond Arbutus Rapid Transit Study

- Millennium Line Broadway Extension to Arbutus has committed funding from Federal and Provincial governments
- Study to determine technology and alignment alternatives to provide rapid transit service between Arbutus St and UBC
- Regional mode share target of 50% walk/bike/transit by 2020, 2/3 by 2040





Corridor Level Application

Key Issues

- 99 B-Line currently has overcrowding and reliability problems.
- Other parallel corridors have similar issues
- UBC enrollment is expected to continue growing significantly
- Limiting local economy to develop technology and medical research hub between UBC and Central Broadway

Key Questions

- Which technology provides the best travel time, capacity and reliability?
- Which technology helps to achieve regional and local mode share and VKT targets?
- Which alignment minimizes costs and is acceptable by host communities?
- Which option is most cost effective?
- Is there net positive benefits to the region with rapid transit investment?





Corridor Level Application

Modelling Approach

- Validate auto and transit volumes and travel times within study area
- Confirm land use assumptions (pop, hhld, emp, enroll) and future forecasts
- Code and run technology and alignment alternatives
- Benchmark ridership forecasts with similar systems elsewhere



Note: Generic alternative to illustrate alignment.



Corridor Level Application

Model Outcomes

- RTM3 is a reliable tool to forecast travel demand and ridership for trips connecting to UBC
- Accurate travel times in model helpful in determine route choice and mode choice
- Rapid transit on its own marginally improves regional transit mode share
- Significant diversion of transit from parallel corridors
 - Route alternatives are similar in terms of network costs
 - Potential for significant user benefits based on initial findings



Corridor Level Application

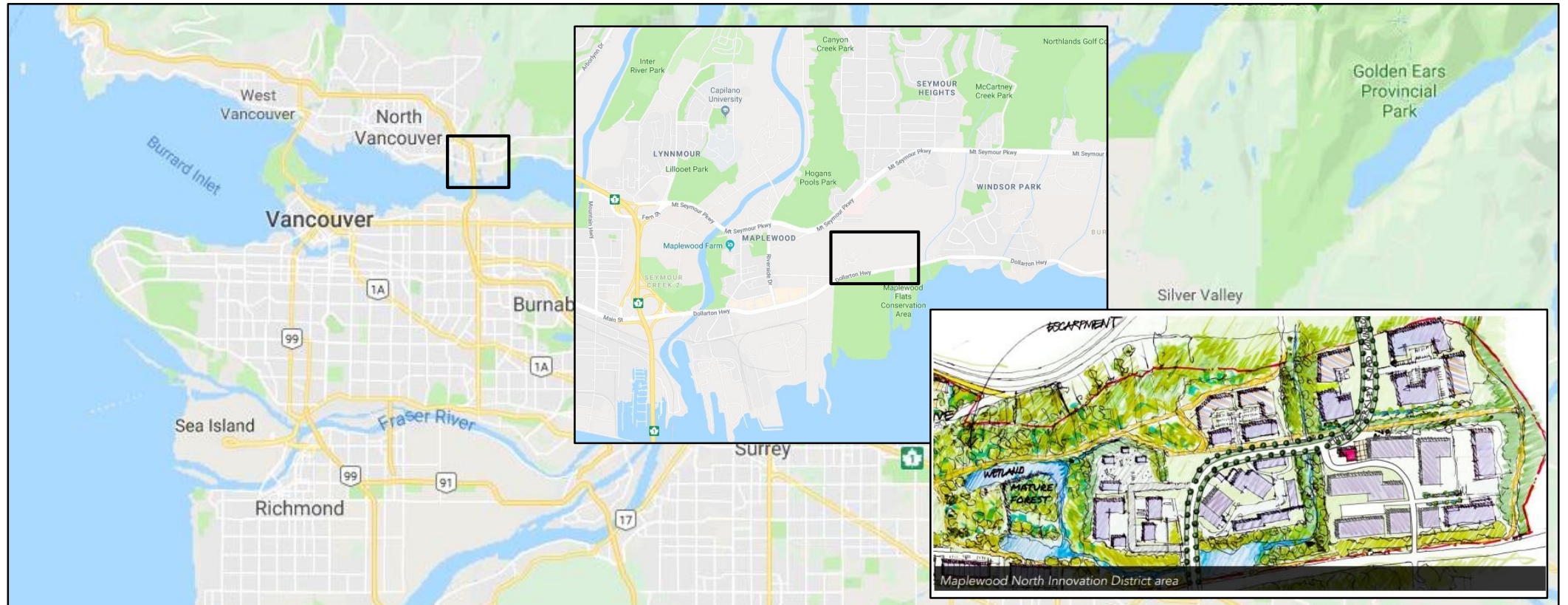
Lessons Learned

- Students have unique trip making patterns (time of day, distribution, etc)
- Congested and capacitated transit assignment is useful to evaluate technology alternatives
 - Have to use the converged transit volumes from the capacitated assignment, not just the final iteration volumes
- Traffic zone disaggregation helpful for walk access to rapid transit stations
- Some issues with land use forecasts (hhlds ↑ while pop ↓ in some zones)
- Vehicle volumes on some arterials were somewhat overestimated



Neighbourhood Level Application

- Maplewood Village & North Shore Innovation District
- New development proposed in the District of North Vancouver
- Understand the impacts to the local and regional transportation network





Neighbourhood Level Application

Key Issues:

- Significant growth and development
 - Lower Lynn Interchanges and Marine Dr. B-Line
- Developments can not be evaluated in isolation
 - Must take into consideration background traffic and anticipated regional growth
 - Cumulative impact of development on traffic congestion ($1+1 \geq 2$)

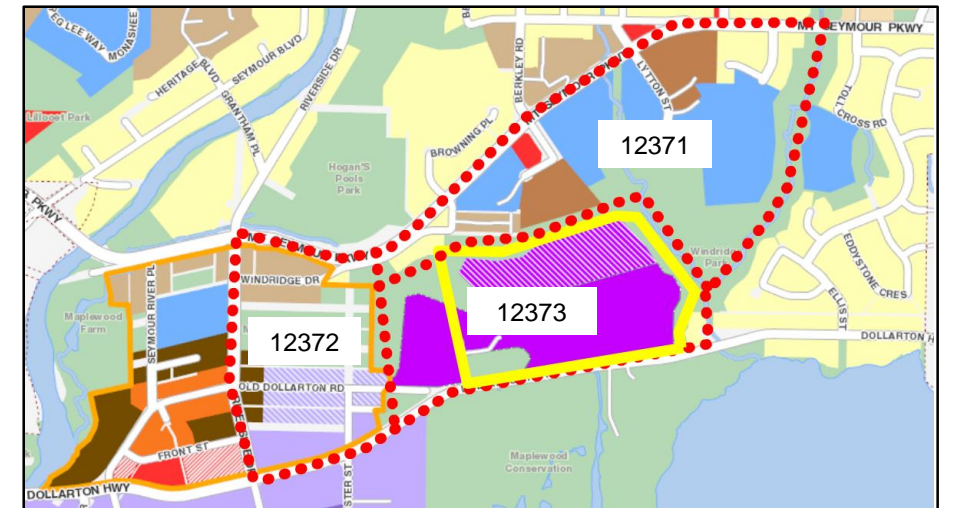
Key Questions:

- What is the impact of the development to local and regional roads?
 - Traffic Volumes; Traffic Congestion; Travel Time
- What are the impacts of sensitivity scenarios?





- Model validation (within study area):
 - Auto Volumes,
 - Auto Travel Time
- Increase detailing for study area
 - Split 1 RTM3 zone to 3 subzones
 - Add local and collector roads
- Review land use assumptions for study area
 - Discussion with District staff
 - Comparison to ITE Trip Generation
- Integration with Vissim
 - Traversal Assignment (Emme)

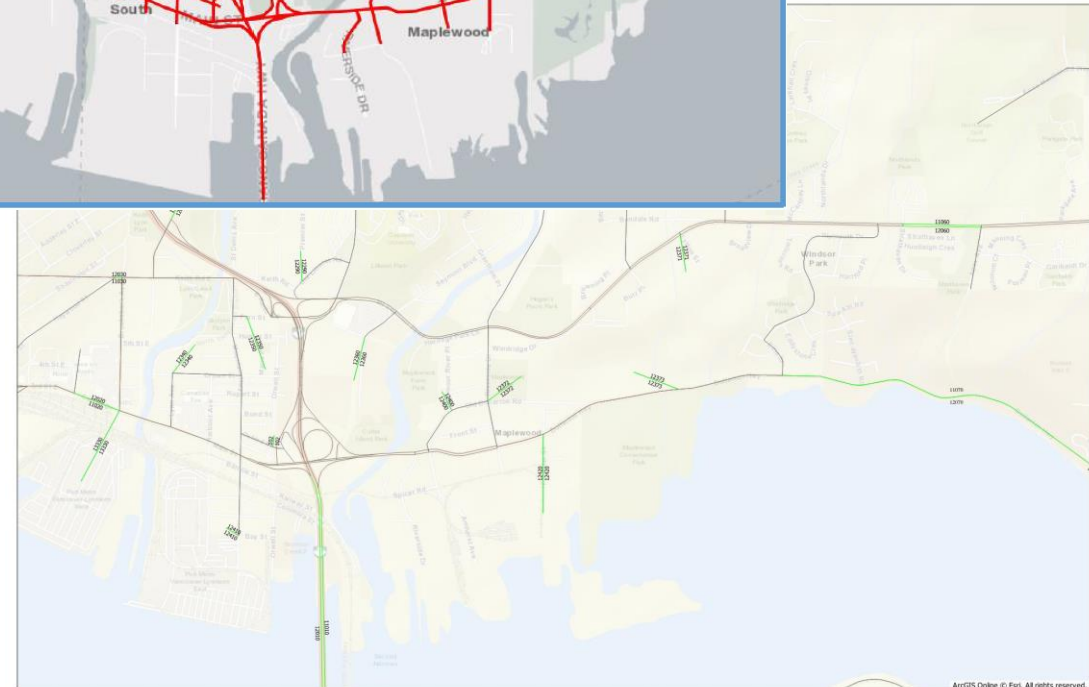
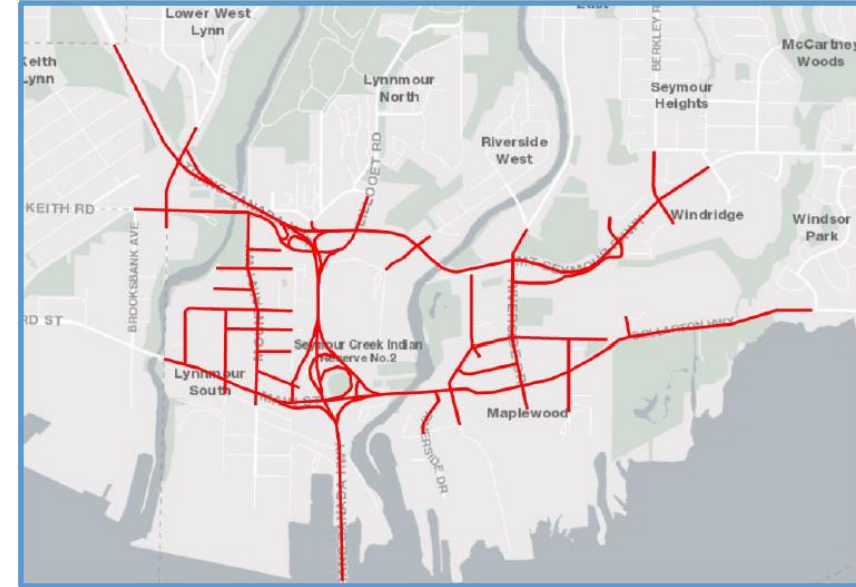




Neighbourhood Level Application

Outcomes / Lessons Learned

- Zone Splitting
 - Single zone splitting is now practical
 - Allocate development to each zone
 - Optimize the zone detail for each project
- Integration with Vissim
 - Traversal Assignment (Emme)
 - Outputs from Emme can be processed as inputs for Vissim (microsimulation) model
 - Operational analysis
 - Visualizations

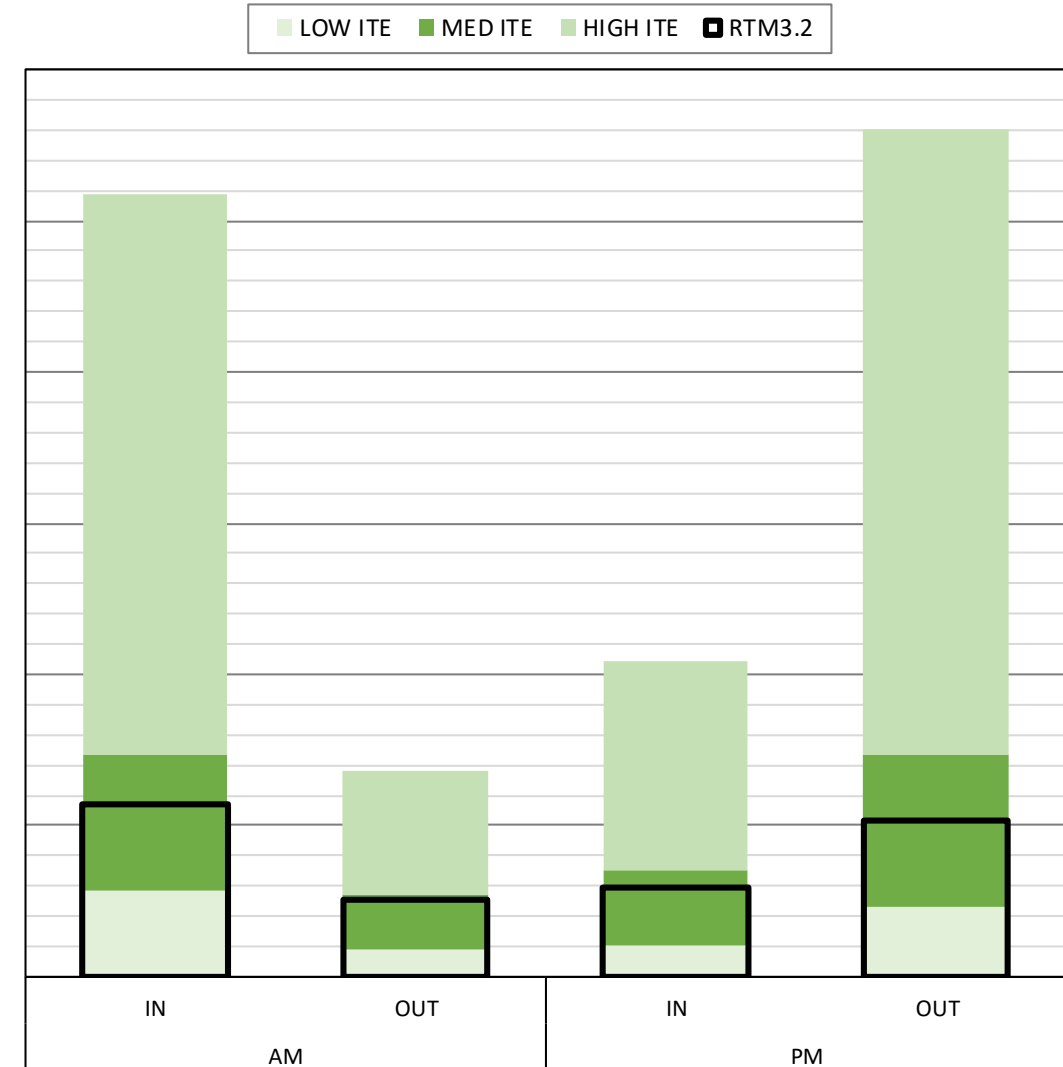




Neighbourhood Level Application

Outcomes / Lessons Learned

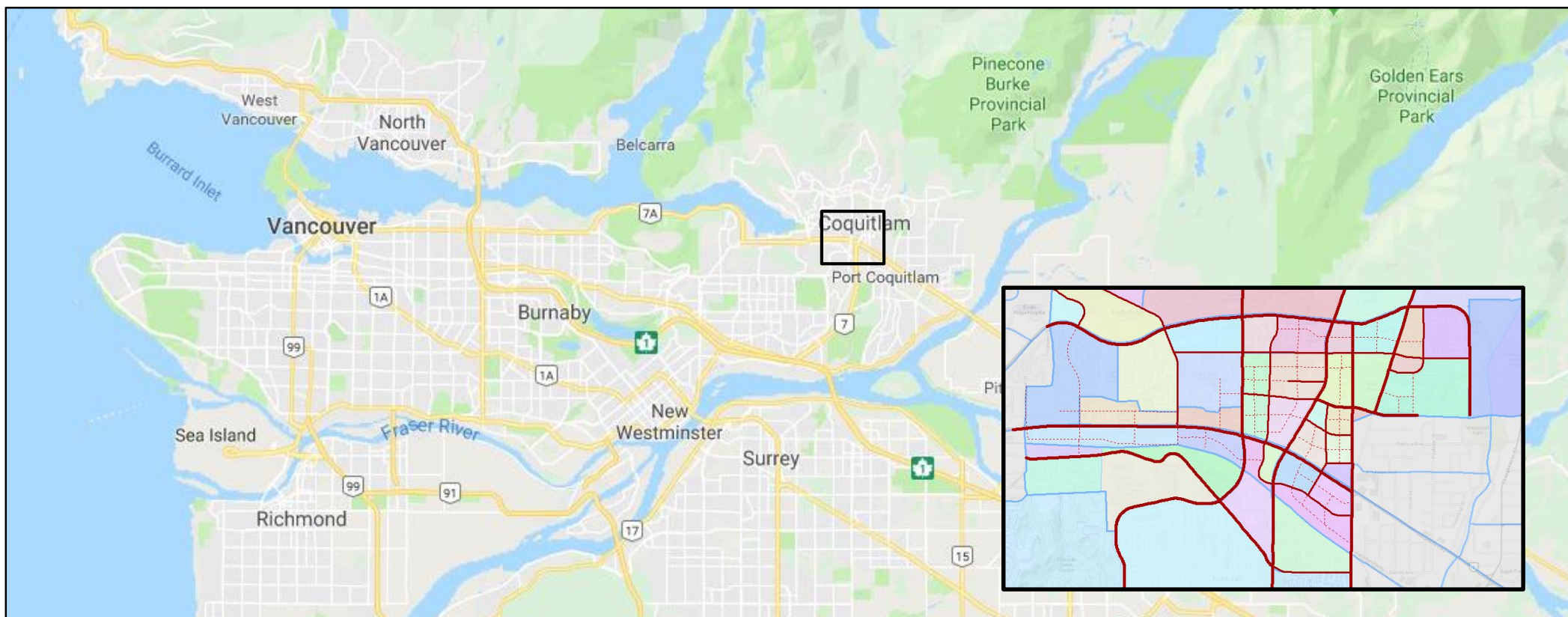
- ITE Trip Generation Backcheck
 - Employment/households (EMME) vs floor space and units (ITE Trip Generation)
 - ITE Trip Generation provides a very wide range
 - Region tends to fall in the low to medium range
 - Validation of land use assumption
 - Development of sensitivity scenarios
 - Ex: Mixed-use development with employee housing programs may warrant higher internalization sensitivity scenarios





Regional Town Centre Level Application

- Coquitlam City Centre Area Plan Update (CCAPU)
- Validate and assess current conditions
- Evaluate proposed roadway servicing plan and future development





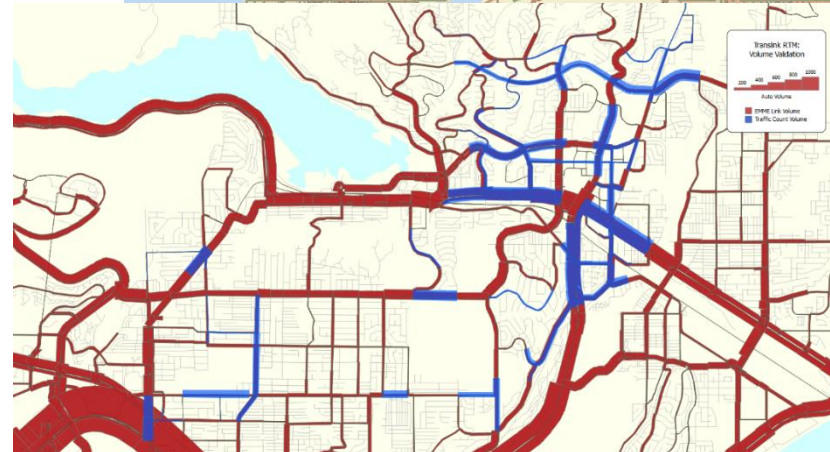
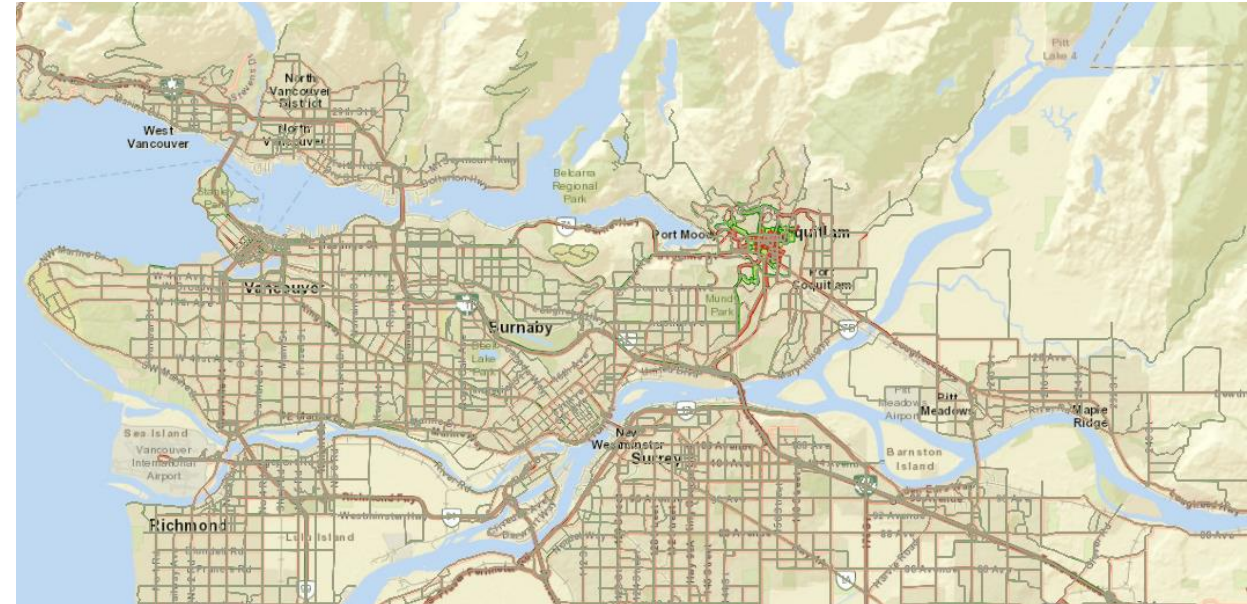
Regional Town Centre Level Application

Key Issues:

- Significant growth and changes in land use
- Regional access patterns servicing town centre
- Impacts to regional roadways

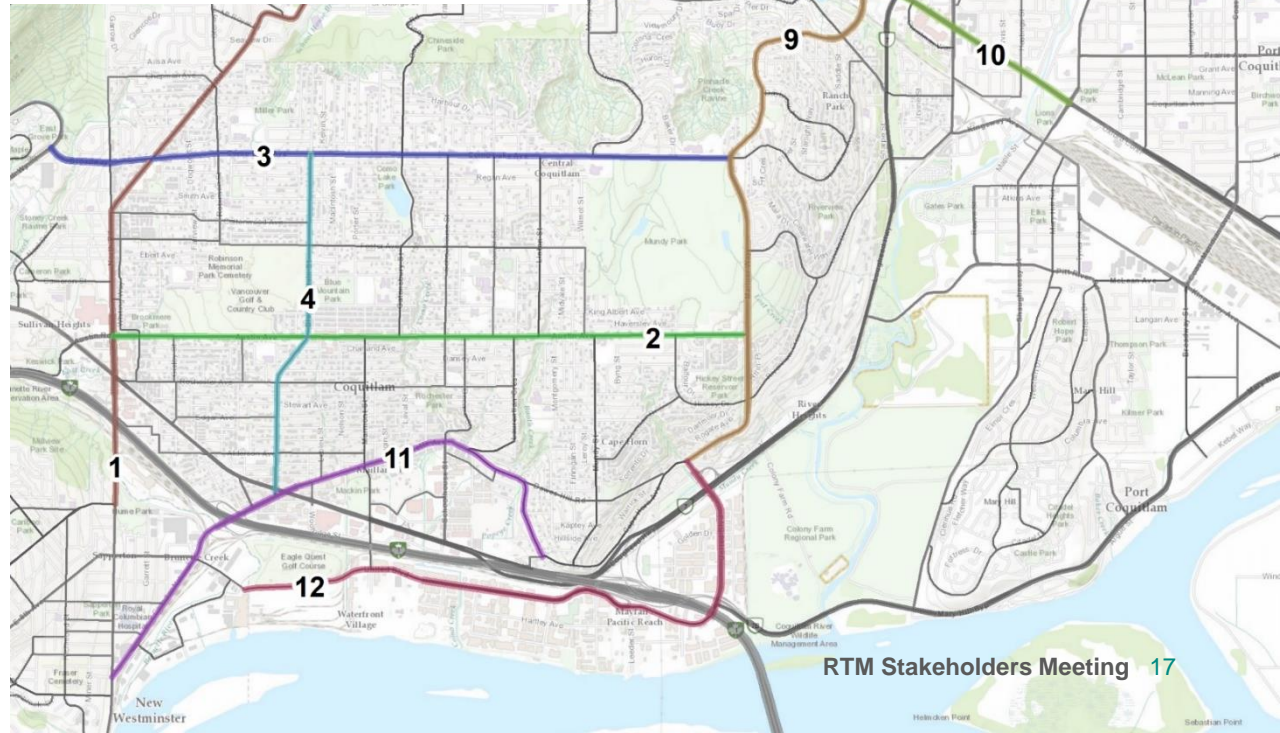
Key Questions:

- Current Level of Service
- Performance of proposed town centre network
- Identify operational issues to refine proposed road network





- Validate present travel time and volumes accessing study area
 - Recent toll removal has had significant impacts to regional travel patterns
- Detail Sub-area zone system reflecting future development and road infrastructure
- Updated land use forecasts
- Visum & Synchro integration for level of service

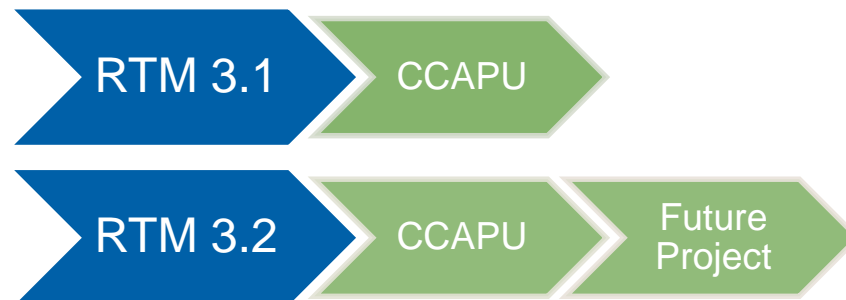




Regional Town Center Level Application

Lessons Learned

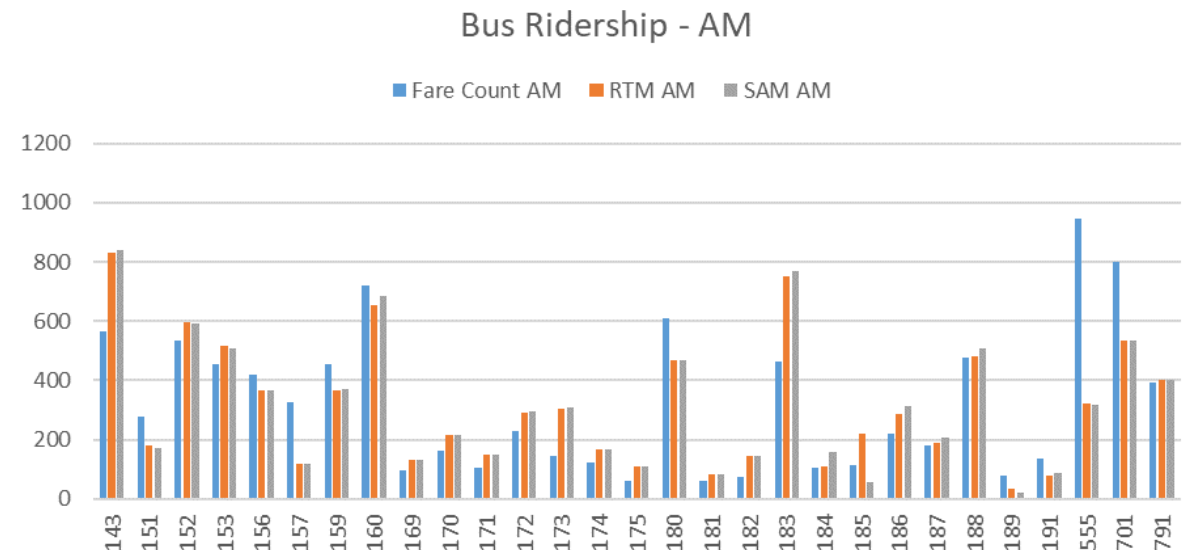
- Ease of adding zones allows finer-grained control over network loading
 - Level of detail finer in CCAPU area than previous Coquitlam sub-area model
 - Land use categories changing from current uses (mall site redevelopment)
- At-grade rail crossings not well represented in RTM
- Fixes to corridor travel times improved fit to counts
- Additional zone detail can be added incrementally for future projects
- Feeding back fixes early made transition from RTM 3.1 to 3.2 easier





RTM3 Useful Enhancements

- Text-based model inputs simplify subarea model development
 - Allows for version tracking
 - Simplifies traffic zone splitting
- Time of day representation, i.e. Midday and PM Peak
- Peak directional travel characteristics well represented
 - AM Inbound vs PM Outbound
- Compass data validation





Suggestions for Future Model Enhancements

- Special Generators
 - University of British Columbia (and maybe other universities)
 - Sea Island/YVR
- At-Grade Rail Crossings
 - Representation through special volume-delay function
- Simplified representation of bus priority lanes
 - Customized transit time function
- Adoption of New Technologies
 - Ridesharing (Uber/Lyft)
 - Connected & Autonomous Vehicles (CAVs)

