

APPENDIX A

**Identify and Evaluate Conceptual Alternative Solutions:  
Planning Framework and Methodology**

## Task 3 – Identify and Evaluate Conceptual Alternative Solutions: Planning Framework and Methodology

TO: I-270/US 33 MORPC Study Team  
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An integral, step in development of step 3 work on transportation conceptual alternatives is the establishment of what will be referred to as the *planning framework*. This memo outlines what is meant by planning framework. It also provides more detailed methodology which will give direction to the study team in the gathering of information, and analysis. This memo is for the funding partners to review and concur on the methodologies and process to be employed for step 3.

### Planning Framework Background

The planning framework represents a combination of ‘ground rules’ or study parameters, assumptions, policy decisions or actions and judgments that will frame or limit where the technical efforts will proceed (and where they will not). Planning framework decisions will reference the purpose and need statements, study goals and objectives, stated geographical project scope limits, regulatory and policy requirements of FHWA and the state, and technical work completed on the analysis of existing conditions and long term traffic forecasts. In the broadest sense, this important step frames the overall ‘context’ for the study.

Articulating the planning framework will in effect establish what the scope of work refers to as initial screening or fatal flaw criteria. The following is an outline of planning framework issues, with more in-depth discussion of each in the paragraphs to follow:

- Major conceptual alternative constraints (physical, environmental, regulatory)
- Fundamental planning inputs and assumptions
- Planning and design criteria
- Applicable transportation solutions (per local/state policies or circumstances of the project)

A presentation on the planning framework was given at the July 2005 Funding Partners Meeting. The following provides the consultant team’s understanding of the four planning framework issues as to be applied for the I-270/US 33 Northwest Freeway Study.

### Major Conceptual Alternative Constraints

Conceptual Alternatives are constrained by the geographic study limits (see Figure 1). Actions, conditions and infrastructure maintained by ODOT, counties or cities outside these limits are as they were in the E&FC report and will be referenced as needed.

Within the study limits, specific land uses (parks, schools, environmentally sensitive lands, etc.), existing and attainable right-of-way, major utilities, and other major infrastructure all represent constraints on what may be reasonable or considered practical.

Land uses that by their nature are off-limits or will constrain what is physically possible to propose have been identified in the E&FC report. At this time, there are no clear self-evident land uses that are a concern.

Solutions will also be considered as constrained in practical terms by the availability of right-of-way along I-270, US 33 and each of the major arterials. Note that some right-of-way acquisition is to be expected; but it is assumed that wholesale, significant takes involving buildings, homes or commercial areas for extended length of highway are impractical and will not be considered. Existing right-of-way limits will be identified in the project mapping.

Major utilities such as high pressure underground gas lines, major electric power distribution lines, and major underground water lines, may represent significant enough features to be considered physical constraints. Currently, no major utilities have been identified in the Red Flag Summary.

The design and character of major river crossings may influence fundamental sizing decisions. These are sometimes based on engineering issues, and other times based on policy issues. The only major freeway river crossing is I-270 over the Scioto River (between US 33 and Sawmill Road). This eight-lane bridge was recently rebuilt. Future traffic demands and/or the realigned US 33/ I-270 interchange may require a 10-lane section in order to meet required LOS criteria. Preliminary analysis should be completed to determine if the existing structure can be widened. There are no significant arterial river crossings within the focus area of the study.

Finally, there are some major transportation projects that are relatively new, and that many stakeholders may hence assume will be untouched. Examples include the Sawmill Road interchange, and the bridge and landscaping treatments at Avery-Muirfield Drive. Within the context of a long-range planning study of I-270, and recognizing the nature of problems to be addressed elsewhere, these improvements may need to be modified at some point in the future. There is nothing within the focus area of the study that is of such nature that it is to be viewed as major infrastructure constraints.

### **Fundamental Inputs and Assumptions**

All stakeholders must agree with certain basic project inputs and assumptions. The following is a typical list of what are considered to be fundamental inputs:

- The land use forecasts as presented in the E&FC report will be the basis for conceptual alternative traffic forecasts.
- MORPC Year 2030 travel forecast – Basic trip table assumptions or data, and ADT forecasts from the current, updated model will form the basis for development and evaluation of alternatives.
- COTA system plans – COTA’s currently adopted long range plan for changes to and expansion of routes is the initial base forecasts. COTA is beginning a process to update their plan and MORPC has begun discussion with COTA on the implications for the study area. MORPC and COTA will continue to work together to develop the a transit plan for the northwest area.
- FHWA Policy on Changes in Access to the Interstate System – FHWA has an eight-point policy covering proposed changes in access to the interstate system. This policy applies to any proposed action involving both existing interchanges as well as new interchanges along

I-270. Adherence to the policy will require understanding of certain technical issues and requirements for documentation in later stages beyond this study. From a planning perspective, it must be shown that new interchanges are consistent with local plans, will not degrade interstate operations, serve a purpose that addresses through or regional versus local movements, and does so in a way that local improvements can not. Specific improvements to interchanges will eventually need to meet strict technical requirements of ODOT and FHWA.

- Ongoing or completed relevant studies and plans by others – This project will incorporate the design of the US 33 & Post/SR 161 interchange currently being designed by the City of Dublin.

### **Planning and Design Criteria**

Highway planning and design criteria will be assembled and reviewed. ODOT standards will be utilized as provided in the ODOT Design Manual. Other policies to be referenced are AASHTO Green Book and FHWA Policy on Interstate Design Standards. For arterial conceptual design, the relevant local jurisdiction standards will also be consulted.

Based on the criteria the following are basic decisions.

- Highway Geometric Design Criteria –
- Design speed for I-270 and US 33 – 70 mph
- Design speed for interchange arterials- 40 mph minimum
- Design speed for interchange elements - As per ODOT and AASHTO standards
- Provision for pedestrians and pedestrian facilities shall be considered in accordance with ODOT Policy 20-004(P), dated April 26, 2005.
- Geometric design for pedestrians and bicycles - As per ODOT standards
- Access control criteria – I-270 is fully access controlled, as is US 33. For arterial and collector roads the access control policies and criteria within the applicable jurisdiction will be achieved. There could be cases where more stringent access management policies are necessary to achieve the desired safety and level of service.
- Horizon Year Traffic – The modeling process employed for the E&FC report will be utilized to develop peak hour traffic for conceptual alternative development and analysis. Note that this is a planning level study and not intended to produce the final detailed design. Additional studies using ODOT certified traffic will be needed as components of the strategic plan move through the rest of the Project Development Process.
- Design Levels of Service – Design year traffic for freeway, interchange and arterials and intersections will produce a potential need for capacity improvements. The means by which these improvements will be characterized is through establishment of a target or minimum threshold level of service.
- Target level of service for I-270 is D. Target level of service for signalized intersections and arterials is E. The equivalent volume to capacity ratios for the targeted level of service for I-270 and signalized intersections and arterials are 0.90 and 0.95, respectively.

## Applicable or Appropriate Transportation Solutions

A wide range of solutions to the traffic operational and safety problems are to be examined in this planning study. This includes both ‘supply’ solutions (e.g., adding new lanes; widening intersections) as well as ‘demand’ solutions (increasing transit, carpool and HOV use, instituting employer trip reduction or peak-hour spreading programs, etc.)

While the consultant team is the lead in the development and analysis of the ‘supply’ items, MORPC will be analyzing the role and impact of the ‘demand’ strategies. As discussed previously MORPC will work with COTA on long range transit plans for the area as well as other demand management strategies. It is not expected that the demand management strategies alone will address the operational issues. However, the analysis will focus on the role these can play to assist in the solution throughout the area and possibly isolated locations.

Thus, the suggested approach to account for these impacts is to assign a nominal effectiveness of a ‘basket’ of demand management proposals in terms of the overall reduction in peak-period vehicular traffic in the design year. This may be on the order of a percent reduction in peak hour traffic demand. In addition, the following design components are established to direct consultant work:

- Location of new park ‘n’ ride facilities within the study area, as this will influence interchange planning
- Provision for special transit features, new stops or transfer points along the corridor that may have physical design requirements or space implications, such as bus bypasses
- Include provisions for ramp metering capability along the corridor (which can influence length, width and alignment of entrance ramps)

### 1.1 Conceptual Alternatives Development and Evaluation

The following is an overview of our intended process for working with our consultant team and ODOT as well as the funding partners’ technical staff.

- 1) Interchange Network Analysis – Consistent with the scope and contract level of effort, we will look at a range of different freeway networks based on proposed locations for new interchanges. Interchange locations will be coded into the MORPC model to create new regional model projections. The intent at this stage is to understand regional impacts and implications of adding new interchanges, as opposed to developing a design.

Analysis of the proposed interchanges shall be performed by creating networks which incorporate or exclude the potential locations. A key determinate in the evaluation of a potential interchange is the amount of local trips (interchange to interchange) that are created. 1) A new interchange should minimize local trip making on the freeways and should not degrade the LOS. 2) A new interchange should reduce volumes using adjacent interchanges thus improving the operation at existing interchanges. 3) A new interchange should not disrupt lane balance and continuity. Another measure of the networks will be the generation of “typical trips”. The consultant team along with the funding partners will develop a series of trip sections in order to differentiate between networks. Travel times for trips from zones near new interchanges and trips to/from EMS locations and trauma centers will be analyzed. These typical trips and other key criteria will be used to evaluate the proposed interchanges against the study’s goals and objectives based evaluation criteria.

This process of comparing and evaluating networks will be used to understand the regional impacts and implications of adding interchanges to the existing system. At this stage a decision will be made as to whether new interchange locations will be carried forward for additional analysis.

- 2) Conceptual Alternatives Level One (Macro) System Analysis – Based on the agreed-upon level of service (D-freeway, E-arterial), sizing of all freeway and crossing arterials will be performed. Sizing refers to basic cross sectional requirements of number of basic lanes. Sizing will be performed for the various different networks as defined by new interchanges carried forward from the previous analysis. Arterial extensions, frontage roads, grade separations and new intersections will be analyzed as part of the different networks. Pedestrian, bicycle, and transit activity will be included in level one evaluation. Also, demand management strategies (ramp metering, new park 'n' ride locations, etc.) will be integrated into the networks. The regional model will be used to evaluate the networks. The results of this analysis will be compared by using the criteria for the goals and objectives. The analysis will be summarized for review by the funding partners. At this stage a decision will be made as to if any of the network configuration scenarios will be dropped from further analysis.
- 3) Conceptual Alternatives Level Two (Micro) System Analysis – This stage will include developing and evaluating solutions in specific locations within the study corridor. The VISSIM model will be used to develop the peak hour volumes for design and analysis. An increased level of detail will be performed at specific locations in order to assemble an overall best plan. Concept plans will be developed in single line form with aerial photography as the reference for the design year. Consistent with scope and contract level of effort, the team will produce and refine concept plans through a series of working meetings with the funding partners, including a presentation of options at a public information meeting and advisory group meeting(s). The intent is to develop a full understanding of the design requirements and attendant cost, right-of-way and traffic operational benefits. The evaluation criteria based on the goals and objectives of the study, will also be used to evaluate the conceptual alternatives at the specific locations.

At the end of the alternatives development and evaluation process the consulting team will work with MORPC to prepare a draft report that summarizes the Step 3 activities. The report will describe all the conceptual alternatives considered and eliminated. The report will be based upon the evaluation process.