

STAFF REPORT

SUBJECT: 101 In Motion

MEETING DATE: August 3, 2005

AGENDA ITEM: 4 A

RECOMMENDATION:

Receive report on evaluation of four alternative packages.

STAFF CONTACT:

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DISCUSSION:

On April 6, 2005 the 101 In Motion Steering Committee adopted the Technical Advisory Group (TAG) and Stakeholder Advisory Committee (SAC) joint recommendations regarding the Final 4 Alternative Improvement Packages which were to receive further technical analysis. The full SBCAG Board approved proceeding with the evaluation of these alternatives at their April 21, 2005 meeting. Since that time the project team has met 7 times with the TAG and twice with the SAC to go over evaluation results of the final 4 alternative packages with the aim of reaching agreement on the evaluation findings. The results of the evaluation are summarized in the attached Working Paper titled "Summary of Technical Evaluation of Final 4 Alternative Packages, July 21, 2005" and will be presented at your August 3 meeting.

As part of the technical evaluation, each of the final alternative packages was screened against the same 33 performance criteria that were used in the Round 2 evaluation, although at a more robust level of detail.

Principal conclusions from the evaluation are:

- Based on the transportation performance and land use sensitivity analysis it is evident that widening of Highway 101 south of Milpas is needed now and will be needed more in the future if severe congestion is to be avoided. Even with implementation of the proposed TDM measures, operational improvements, and addition of commuter rail, widening would be needed. Without widening, stop-and-go congestion would not only occur during the peak hours, but it would extend to

adjacent hours such that severe congestion would be continuous daily from 7:00 AM to 8:00 PM. Even assuming constrained population and employment growth in the South Coast, the land use sensitivity analysis indicates that widening of Highway 101 south of Milpas will be needed in the future.

- Commuter rail service from Ventura County to Santa Barbara and Goleta would attract a substantial number of motorists out of their cars and serve as an alternative to Highway 101, particularly while the additional lanes were being constructed. Implementing commuter rail service will require lead time to obtain approvals and enter into operating agreements with UPRR and Ventura County, secure funding, construct the necessary capital improvements and purchase rolling stock before this service can begin. Realistically, this may take 4-5 years to accomplish.
- Improvements to many of the freeway ramps and intersections at the ends of these ramps will be required.
- There are a number of Transportation Demand Management (TDM) and operational improvements that can be implemented at relatively low cost that will help to reduce congestion early on and in the long-term. Some of these can be early start projects and serve to relieve congestion until more capital intensive improvements are implemented. They include:

TDM

- Adjustments to work schedules (FlexWork and FlexTime)
- Individualized marketing
- Ridesharing pricing incentives (Reducing vanpool fees and reimbursements for carpooling)
- Variable parking rates at public lots and garages
- Increased transit service
- Bus priority on selected streets
- Voluntary adjustments to freight delivery hours

Operational Improvements

- Ramp Metering
- Intelligent Transportation Systems (surveillance and communications)
- Ramp improvements and auxiliary lanes at bottleneck locations

- HOV lanes instead of HOT lanes are recommended for new lanes. Also, more people would be served by the added capacity with new HOV lanes than with new general purpose lanes. The projected usage of the HOV lanes would be substantial and would meet Caltrans warrants. The conditions which must be present for high occupancy toll (HOT) lanes to be financially successful are not projected to be present in the 101 corridor. Whether the HOV lanes are HOV lanes all day or peak period HOV and off-peak general purpose lanes needs further analysis.
- Widening of Highway 101 could result in substantial impacts to the natural and built environment. Steps should be taken to design and construct the widening to minimize these impacts. Some ways to minimize these impacts include:
 - Avoiding displacement of residents and businesses
 - Adjusting the centerline of the freeway to avoid significant environmental constraints

- Maintaining a reduced landscaped median to the maximum extent possible (6 foot is assumed) in areas where adequate shoulders can be constructed to assure maximum safety for future maintenance workers.
 - Considering reduced cross-section width involving design exceptions from applicable design standards at the most restricted locations where appropriate and only after adhering to the design exception process that requires that there be no compromise of safety of any stakeholder group.
 - Maintaining landscaping to the maximum extent possible on both sides of the freeway in accordance with the *101 Design Guidelines for the South Coast*, including replacement landscaping where existing landscaping needs to be reduced
 - Giving the affected communities the option of sound walls where noise criteria indicate that there will be a sufficient increase in noise levels at sensitive receivers to warrant consideration of sound walls. Where implemented, these sound walls would significantly improve noise conditions for neighborhoods already impacted by freeway noise, but are considered by some communities as visually obtrusive. “Green walls” (ivy covered sound walls) have been an acceptable solution in some communities for resolving the trade-off between noise or visual affects.
 - Using design elements that preserve the unique character of the corridor while meeting all applicable safety, operational and maintenance requirements.
- With regard to the existing 6-lane section of Highway 101, only the addition of full lanes as currently reflected in Alternatives B or D could potentially fully resolve projected 2030 congestion. (And even these alternatives would require some further capacity at certain locations). Some combination of adding full lanes and/or auxiliary lanes only where needed to resolve the major bottlenecks, while avoiding significant environmental impacts is another, albeit lesser option from a transportation performance perspective. Whether full lanes or auxiliary lanes are needed should be determined by more detailed capacity and weave analyses.
 - The existing 4-lane sections of 101, in both directions between Fairview Avenue and Los Carneros Road and between Los Carneros Road and Glen Annie Road warrant consideration for operational improvements. Whether full lanes or auxiliary lanes are needed should be determined by more detailed capacity and weave analyses.
 - The land use sensitivity modeling suggests that reductions in growth assumptions could lessen the need for freeway capacity improvements north of Milpas. This issue could be revisited in the future to take into account changes in land use plans and policies by the County, City of Goleta and UCSB prior to undertaking major capital projects.

COMMITTEE REVIEW:

The Technical Advisory Group has been reviewing drafts of this information for the last two months and determined that it was now suitable for broader public review. The SAC met on July 25 to review the material.

ATTACHMENTS:

Summary of Technical Evaluation of Final 4 Alternative Packages, July 21, 2005



DRAFT

Summary of Technical Evaluation of Final 4 Alternative Packages Revised July 21, 2005

Background

On April 6, 2005 the 101 In Motion Steering Committee adopted the Technical Advisory Group (TAG) and Stakeholder Advisory Committee (SAC) joint recommendations regarding the Final 4 Alternative Improvement Packages which were to receive further technical analysis. The full SBCAG Board approved proceeding with the evaluation of these alternatives at their April 21, 2005 meeting. See summary chart of the four Final Alternative Packages. Presented in this summary report are general findings from the technical evaluation.

Evaluation of the Final 4 Alternative Packages

As part of the technical evaluation, each of the final alternative packages was screened against the same 33 performance criteria that were used in the Round 2 evaluation, although at a more robust level of detail. The performance criteria are grouped into three categories, 1) Transportation; 2) Community/Environmental Considerations; 3) Implementation Related Criteria.

During the Round 2 evaluation, nine of the criteria appeared to provide the most useful information in identifying differences between the alternative packages. The summary of general conclusions of the Final 4 Alternative packages focus on these 9 key differentiators which are shown in bold in the Table on the next page:

Evaluation Criteria

<p><u>Transportation:</u></p> <ul style="list-style-type: none"> A. <u>Improve Mobility/Increase Capacity</u> B. <u>Reduce Congestion</u> C. <u>Reduce Travel Delays</u> D. <u>Improve Safety</u> E. <u>Provide Options/Increase Choices</u> F. <u>Improve Trip Reliability</u> G. <u>Improvement Longevity</u> H. <u>Improve Goods Movement</u> 	<p><u>Implementation Related Criteria</u></p> <ul style="list-style-type: none"> Q. <u>Cost Effectiveness</u> R. <u>Physical Feasibility</u> S. <u>Technological Feasibility</u> T. <u>Institutional Constraints</u> U. <u>Construction Impacts</u> V. <u>Phaseability</u>
<p><u>Community/Environmental Considerations:</u></p> <ul style="list-style-type: none"> I. <u>Natural & Built Environment</u> J. <u>Neighborhoods</u> K. <u>Air Quality</u> L. <u>Noise Impacts</u> M. <u>Visual Impacts</u> N. <u>Economic Vitality</u> O. <u>Shareholder Equity</u> P. <u>Sustainability</u> 	

General Findings from Evaluation of the Final 4 Alternative Packages

The following are general conclusions that can be drawn from the Technical Evaluation of the Final 4 Alternative Packages. It should be understood that the transportation analyses shown here rely on planning level working assumptions regarding roadway design features and the capacity values associated with these concept designs. In reality, highway capacity values vary sub-segment by sub-segment based on a number of factors including physical attributes such as lane and shoulder widths, type of terrain, significant grades, frequency and distance between on-and-off ramps, and operational aspects such as the proportion of trucks. To the degree appropriate during planning, these factors have been taken into consideration in the transportation analyses. More definitive traffic analyses would be performed during subsequent phases of project advancement, once a project is selected and programmed for the corridor.

Also, it should be noted that the technical evaluation is based on the currently adopted regional growth forecasts. These forecasts envision a 20 percent growth in population for the South Coast by 2030 and a 40 percent growth in employment. Appendix D describes the assumptions underlying the regional growth forecasts used in the transportation analyses. The effects of a significantly constrained growth forecast were analyzed in a sensitivity test performed by

SBCAG. The findings from the sensitivity test are summarized in Appendix E. It indicates that if land development in the western portion of the corridor were significantly constrained, it could affect future travel patterns and thereby transportation facility needs in this portion of the corridor where the greatest amount of vacant land planned for development exists. The findings indicate however that the projected congestion in the existing 4-lane section of Highway 101 to the south would not be avoided even if there was minimal population and employment growth in the South Coast.







I. Transportation Performance – General Conclusions

- As can be seen in the LOS maps in Appendix A., Alternative Package B (Commuter Rail + HOV Lanes) would do the most to relieve congestion forecast by 2030 on US 101. Alternative Package D (General Purpose Lanes) would provide significant relief, but not meet the performance standard of LOS ‘D’ in a number of locations, including during the afternoon peak hour southbound between Milpas Street and S. Padaro Lane. Alternative Package C (HOV Lanes South of Milpas/Auxiliary Lanes North + Commuter Rail) would provide congestion relief close to Package B for the area south of Milpas, but the auxiliary lanes added in the existing 6-lane section would not offer sufficient congestion relief in this area, particularly between Las Positas and La Cumbre/Las Palmas during the PM Peak Hour. Alternative Package A (Commuter Rail) would provide the least congestion relief with extreme congestion (LOS ‘F’ conditions) South of Cabrillo/Hot Springs northbound during the AM Peak Hour and in both directions during the PM Peak Hour. With Alternative A, the existing 6-lane section would be at LOS ‘E’ during the AM Peak Hour, and LOS ‘E’ and ‘F’ during the PM Peak Hour. (See Appendix A for 2030 AM and PM Peak Hour Flow & V/C Ratio Maps for all of the Alternatives and No-Build condition). It is important to recognize in looking at the LOS maps that any of the locations shown as LOS F would in fact be “pinch points” with queues often extending well beyond the limits shown in orange and red at each location. Also, it should be understood that the projected traffic volumes reflect expected changes in the distribution of traffic using the freeways vs. surface streets with each alternative, but do not reflect a possible reduction in peak hour trips by people who would shift the time of their trip to avoid peak hour congestion or avoid making their trip entirely in a highly congested situation, as projected in the No-Build and with Alternative A.

The graphic on the next page depicts the relative traffic density, speeds, and flow conditions for different levels of service (LOS) on a highway:

LEVELS OF SERVICE

for Multi-Lane Highways

Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		60	Highest level of service. Traffic flows freely with little or no restrictions on maneuverability. No delays
B		60	Traffic flows freely, but drivers have slightly less freedom to maneuver. No delays
C		60	Density becomes noticeable with ability to maneuver limited by other vehicles. Minimal delays
D		57	Speed and ability to maneuver is severely restricted by increasing density of vehicles. Minimal delays
E		55	Unstable traffic flow. Speeds vary greatly and are unpredictable. Minimal delays
F		0-55	Traffic flow is unstable, with brief periods of movement followed by forced stops. Significant delays

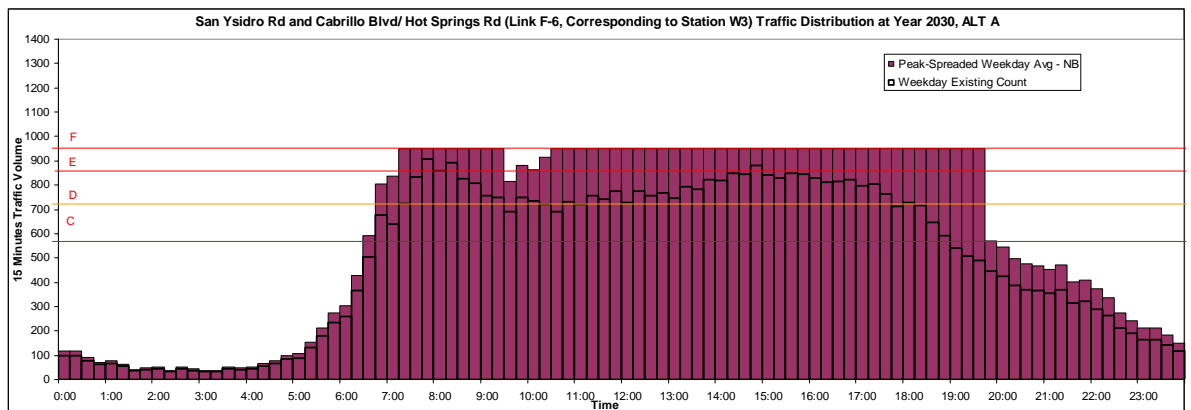
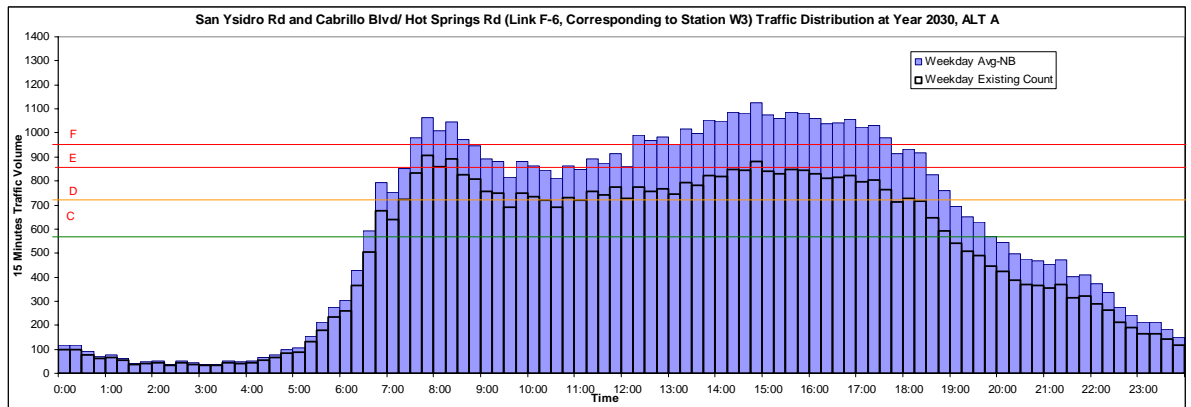
Source: 2000 HCM, Exhibit 21-3, Speed-Flow Curves with LOS Criteria for Multi-Lane Highways

- The flow maps and Tables B-2 show the spot locations where congestion is projected by 2030 on the 101 freeway with each of the Alternative Packages, but don't reflect the queuing or backup as a result of the duration of time over which these conditions will occur. The Duration of Congestion at LOS F at two critical locations is shown for 2030 conditions in Table B-3 and graphically in the Figures that accompany Table B-3 for each Alternative. What is most significant from Table B-3 and the "peak spreading" graphics is the effect that Alternative A would have on extending the duration of peak period congestion compared to today.

 - By spreading the peak congestion (assuming no trip diversion) for the section south of Cabrillo/ Hot Springs to the county line, by 2030 with Alternative A extreme stop-and-go congestion in the northbound direction is projected almost continuously from 7:00 AM to 8:00 PM daily, and continuously from 10:30 AM to 10:00 PM in the southbound direction. With the other Alternatives the duration of the congestion would be much less. In fact with Alternative B, the congestion would only be for a short period of time (less than an hour) in the southbound direction during the afternoon peak in 2030. The duration of congestion with Alternatives C and would be between 3.5 and 4 hours (from 2:00 PM to 6:00 PM) in the southbound direction, with no congestion northbound in 2030. The reason

that the duration of congestion is projected to be so long South of Cabrillo/Hot Springs with Alternative A in 2030 is that existing volumes approach capacity for much of the day today, and volumes are projected to grow by 25% by 2030, yet no additional capacity is added with this alternative. The graph below shows how this is projected to be the case. The existing volumes are the portion of each bar below the black line, and the new increment by 2030 is the portion above the black line. Even today the LOS is D and E for much of the day. The second graph shows how the projected 2030 volumes are assumed to spread once they reach capacity at the LOS F line.

The peak spreading analysis does not take into account that under extremely congested conditions, such as shown for Alternative A, some residents, workers and visitors would choose to not make their trips at all. Further, if this level of congestion was allowed to exist over an extended period of time, some people would leave the area and some would choose not to move to or work in the South Coast in the first place.



➤ For the existing 6-lane section north of Carrillo, by 2030 the duration of congestion would be 2.25 hours in the AM Peak and 2.25 hours in the PM Peak southbound with Alternative A, and 1.5 hours northbound in the AM Peak. For Alternative B the only congestion would be southbound during an hour in the AM Peak. Congestion with Alternative C would last 2.25 hours southbound in the AM and 3 hours in the PM; in the northbound direction the congested period would be

1.5 hours in the AM. For Alternative D congestion would last 45 minutes in the AM southbound and 3 hours northbound in 2030.

- The difference in the level of congestion with each of the Alternatives is also reflected in the amount of person hours of delay forecast to be reduced. The daily hours of delay projected to be reduced in 2030 compared to the No Build condition is 5,600 with Alternative A, 18,700 with Alternative B, 14,400 with Alternative C, and 15,700 with Alternative D.
- The volume/capacity analyses indicate that by 2030 the southbound section of Highway 101 south of the SR 150 interchange would be over capacity with all the Alternatives. There are presently 3 lanes northbound but only 2 lanes southbound between SR 150 and Bates Road. Additionally, even with the most aggressive alternative, Alternative B, there are several other locations on Highway 101 where additional improvements may be needed, even though they don't show up as LOS 'F' in the current analysis. Further operational analyses are needed to determine this, but the suspect locations are those that are shown as LOS 'E' conditions on the flow maps. Additionally, with Alternative C, an operational analysis would be needed to better determine whether the proposed conditions would be adequate between the Las Positas and Hope Avenue/Las Palmas interchanges. This section shows up as LOS F in both directions during the PM Peak Hour using the broad brush capacity criteria.
- The traffic assignments using the SBCAG model show that by 2030 a number of the on-and-off ramps in the corridor will be over capacity (6 ramps with Alternative A, 7 ramps with Alternatives B and C, and 8 ramps with Alternative D). Based on the volume/capacity ratios shown in Table B-2, the same 2 on-ramps and 3 off-ramps shown with 'X's below will need to be widened to two lanes to accommodate the projected volumes with all the Alternatives. Those shown with 'O's will need capacity improvements, but may not require adding a full lane. It should be noted that there may be other ramps that require capacity improvements, since not all ramps were included in the comparative analysis.

Ramp Location	Alternative A	Alternative B	Alternative C	Alternative D
Garden NB On-Ramp	X	X	X	X
Mission NB On-Ramp	X	X	X	X
Las Positas NB Off-Ramp	X	X	X	X
Carrillo SB Off-Ramp	X	X	X	X
Mission SB Off-Ramp	X	X	X	X
Las Positas SB On-Ramp		O		O
Patterson SB On-Ramp		O	O	O
Fairview SB On-Ramp	O	O	O	O

X = Needs to be widened to 2 lanes O = Capacity improvement could be less than full lane

- Relieving congestion on the freeway mainline by adding capacity would result in higher volumes at the freeway ramps and result in a degradation of the LOS on many of the surface streets that intersect with these ramps. Some parallel streets will benefit however from the freeway congestion being reduced. This would result from motorists who used the surface streets to avoid the freeway congestion returning to the freeway. The projected conditions are reflected in Table B-1 for intersections and in Table B-2 for arterial segments. Most of the intersections are at Highway 101 ramp locations. Out of the 34 intersections analyzed, with Alternative A 12 intersections that would be at LOS 'E' or 'F' with the No-Build would improve; 3 would improve and 7 would worsen with Alternative B; one would improve and 8 would worsen with Alternative C; and 2 would improve and 10 worsen with Alternative D. Further, there are 10 locations projected to be at LOS 'F' with Alternative A, 17 with Alternative B, 19 with Alternative C, and 18 with Alternative D. Fifteen of the intersections analyzed would be at LOS 'F' with No-Build conditions.
- Compared to the No-Build conditions, by 2030 travel times by auto would be substantially improved in Alternatives B, C and D; and improved minimally with Alternative A. Savings of 15 to 20 minutes in driving time would be possible during the peak hours between Santa Barbara and Carpinteria/Ventura County with Alternatives B, C and D compared to Alternative A or the No-Build condition. Travel times by transit between these same locations would improve significantly with Alternatives A, B and C with commuter rail; and less so with Alternative D. (See Tables C-1 and C-2).
- With regard to safety performance, information on highway accident trends statewide and in the U.S. 101 corridor in the South Coast collected by Caltrans indicates that recurrent congestion is a major contributor to accidents. In particular, rear end collisions increase with congestion related queue formation and unstable flow. Accident rates for a given volume on urban freeways (in accidents per million vehicle miles of travel) are 40 – 50 % higher on 4-lane freeways compared to 6-lane freeways. Even as both the 4-lane and 6-lane freeways approach their capacity limits the accident rates are higher on average for 4-lane freeways than the 6-lane freeways (1.25 vs. 1.10 accidents per million vehicle miles of travel). Additionally, the severity of accidents in the 101 corridor (measured by the percent fatal and injury accidents of total accidents), has been lower both as a rate and as an absolute number for the existing 6-lane segment compared to the 4-lane segment south of the Milpas interchange. Based on these Caltrans data, Alternative Package B, which provides for more stable traffic flow than any of the other alternatives is rated as having the best safety performance. Alternative A (Commuter Rail) is rated the poorest from a safety standpoint because it would do the least to reduce congestion on US 101. Alternatives A, B and C introduce potential conflicts between commuter rail trains and cross-street traffic at grade crossings. (See Table D-1)
- Alternative Packages B (Commuter Rail + HOV Lanes), A (Commuter Rail), and C (HOV Lanes South of Milpas/Auxiliary Lanes North + Commuter Rail) would attract the most single occupant motorists out of their autos on to transit and HOVs. Alternative D (General Purpose Lanes) would do the least to reduce SOVs. (See Table E-1)
- Projected commuter rail ridership in Alternatives A, B and C are substantially higher (over 80%) than projected for the corresponding alternatives in the previous Round of evaluation

due to the line being extended to Camarillo to serve the additional residents there, as well as an additional train being added to the proposed service so that there would be three round trips per day in addition to the assumed Amtrak train service. Costs for both capital improvements and O&M would also be higher, although not in direct proportion to the ridership increases. One reason for this is that capital costs for parking at stations were reduced in the present scheme based on input from VCTC. (See Appendix C - Santa Barbara Commuter Rail Study Draft Final Report).

- The HOV lanes in Alternative Packages B and C are projected to be well utilized and effective in helping to reduce congestion and exceed Caltrans minimum usage guidelines for operation of HOV lanes. The projected HOV volumes by 2030 are so high (over 1,600 vph) during the AM and PM Peak Hours, that there would be little available capacity to allow SOVs paying a toll to use the HOV Lane. The only way the HOT Lane concept might work is if it were phased over time, (i.e. where it increases from HOVs being 2+ occupants initially to 3+ occupants required as capacity is reached). By 2030 only about 20% of the 1,600 multi-occupant vehicles projected to use the HOV lanes during the peak hours would be in 3+ vehicles as opposed to 2+ occupant vehicles. If only 3+ vehicles were allowed to use the HOT lanes for free, the number of 3+ occupant vehicles would undoubtedly increase. Data from Houston, where they converted 2+ HOT lanes on I-10 to 3+ during specific peak hours resulted in far more 2+ carpoolers shifting to the shoulders of the peak hours where they could travel for free as 2+ HOVs rather than forming 3+ carpools. This raises the policy issue of whether the HOT Lane concept is being considered as a means to reduce congestion or to generate revenue. If it is the latter, it should be recognized that most existing HOT Lane projects in the U.S. barely cover their operating and maintenance costs let alone generate surplus revenue to amortize capital costs. Moreover, no single lane HOT lane where there are adjacent free lanes has been able to generate surplus revenue. Factors required for a revenue generating HOT Lane are:
 - Congestion in the free lanes over most of the day, not just the peak hours
 - Multiple lanes being tolled
 - Can't give away free access to too many free autos (i.e. must be 3+ vehicles from the outset)

Taking these factors into consideration, the context in the 101 corridor through the South Coast does not indicate that HOT lanes would be viable as a long-term means of reducing congestion or for paying for the capital costs of adding the lanes. HOV lanes on the other hand could be expected to be well utilized during the peak hours. Further analysis is needed to determine whether they should be designated as all-day or peak period only HOV lanes that are open to general traffic at other times.

II. Community/Environmental Considerations – General Conclusions

- As is standard for a corridor study, no detailed environmental impact analyses were performed. In general however based on the relative importance to the community of different criteria as established through public outreach, and based on a broad-brush analysis

of environmental factors and the amount of potential impact to the natural and built environment, the environmental issues of greatest concern are: (1) right-of-way impacts, (2) visual quality, and (3) noise. Permits and coordination with several resource agencies will be necessary for project approval prior to construction of whichever alternative package is eventually decided on. Any impacts will require avoidance, minimization, or mitigation. Some of the coordination/ approval agencies are: Army Corps of Engineers, State Historic Preservation Office, National Oceanic Atmospheric Administration, Department of Fish and Game, Regional Water Quality Control Board, FEMA, and Santa Barbara County Flood Control. Most of Highway 101 is in the coastal zone and thus a Coastal Permit will likely be required from the cities in the corridor and/or the Coastal Commission.

- The larger the footprint of the proposed alternative relative to available state highway or UP right-of-way, the greater the potential right-of-way impact. This pattern is largely related to the freeway options (General Purpose vs. HOV/HOT lanes vs. Auxiliary Lanes vs. No Widening) in those areas where the existing width of the state ROW is narrow and constrained. Reconstruction of interchanges also presents ROW impacts.
- In the environmental evaluation, Alternative Packages B, C and D benefited from assumed centerline shifts of the roadway as a method of widening to minimize impacts. Further reductions of environmental impacts might be achieved if reduced cross-sections rather than standard cross-sections are implemented in the most constrained locations. These would require design exceptions from Caltrans and FHWA, which are only considered when a project is further along in the project development process than the stage that 101 In Motion is at.
- With regard to potential impacts on the Natural Environment, minimal impacts are anticipated with Alternative Package A. With Alternative Packages B, C and D there would likely be some impacts to the natural environment resulting from the centerline shifts toward the UPRR ROW. In the section from Sheffield Drive to South Padaro Lane, U.S. 101 comes close to the coast, and there may be some impacts to the coastal bluff areas, which can lead to geologic instability as well as visual issues to this sensitive habitat area. In the vicinity of Memorial Oaks, it is likely that there will be some impacts to some of the 15 trees that are located on the south side of the freeway (as identified in the 1992 Caltrans Project Report). The freeway also crosses several channels and natural waterways. Some of these contain small areas of wetland and/or associated riparian habitat. (See Table I-1) Further environmental assessment will be performed at later stages of project development to fully determine impacts to the natural environment.
- Relative to potential impacts to the Built Environment, there are a number of publicly owned park, recreational areas, and wildlife and waterfowl refuge areas that qualify as Section 4(f) resources in the 101 Study Area and that are currently situated close to the UPRR right-of-way. These could be affect indirectly by commuter rail service being added in Alternative Packages A, B and C. More direct impacts will occur where the proposed footprint of U.S. 101 is predicted to exceed available state right-of-way and extends into adjacent properties. These occur with Alternative Packages B, C and D.

- In the vicinity of Posilipo Lane, between San Ysidro Road and Sheffield Drive, four residential parcels would be impacted (partial acquisition) due to the added lanes.
 - In the Memorial Oaks area, preliminary studies show that the trees in the median would be preserved (approximately 21 trees), but there is a strong likelihood that up to 15 Memorial Oaks trees on the southbound side would be directly impacted (i.e. relocated or removed) due to the added lanes.
 - The proposed auxiliary lane on the southbound side of U.S. 101 between Carrillo Street and Garden Street would directly impact Montecito Street for a short section by as much as 12' in width depending upon how U.S. 101 would be reconfigured to accommodate the proposed auxiliary lane. To minimize these direct impacts to Montecito Street as well as any related effects to the commercial properties that line Montecito Street, on-street parking could be relocated to off-street lots. The proposed auxiliary lane in conjunction with Montecito Street would be located very close to the Moreton Bay Fig (historic tree, planted in 1877), located at the corner of Chapala Street and Montecito Street. There is a risk that this local landmark would be directly impacted, unless a reduced cross-section rather than a standard cross-section is incorporated.
 - Encroachment into the UP right-of-way is predicted to occur in approximately seven segments, the level of encroachment ranges from approximately 4 feet to as much as 26 feet. In three of these seven segments, the level of encroachment into the UP right-of-way would likely require that the existing tracks be relocated (shifted south) within the existing UP right-of-way. Any impacts to the UP right-of-way adds a level of complexity and cost to the project, as approval of the right-of-way acquisition and any track relocation would require the full cooperation of the Union Pacific Railroad.
 - The 101 Operational Improvements Project at Cabrillo/Hot Springs will eliminate the current median on-ramp to southbound US 101. However, two left-side median ramps will remain, and reconfiguration of this interchange into a full-diamond would likely require realignment of some adjacent arterials as well as have right of way impacts both north and south of the freeway. The impacts on the north side could be avoided if only southbound ramp improvements are proposed.
 - In general terms, Alternative C has fewer instances of encroachment into the UP right-of-way compared to Alternatives B and D (2 vs. 7). However, Alternative C is more apt to affect properties near the existing state right-of-way line because the auxiliary lanes that are added are added to the outside of U.S. 101. (See Table I-2).
- Proposed changes to U.S. 101 (e.g., added travel lanes) with Alternative Packages B, C and D would incrementally increase noise levels for adjacent sensitive receivers, but it will be difficult for residents to perceive this difference due to the high amount of traffic noise that they currently experience along the freeway. (Alternative A is not predicted to result in marked change in noise levels compared to the Year 2030 Baseline Condition). It is expected

that implementation of Alternatives B, C or D would warrant the provision of sound walls on both sides of the freeway for much of its length next to sensitive receivers where none currently exist. The construction of these sound walls would not only mitigate the increased noise levels attributable to the new HOV/HOT lanes, general purpose or auxiliary lanes, but would also provide a marked benefit to those neighborhoods already experiencing high levels of freeway noise. With mitigation, the net result would be an improvement upon the 2030 Baseline Condition. However, the construction of sound walls could result in a significant negative visual impact depending upon the views of the affected community. Because of the visual impacts, some communities might elect to not have the sound walls constructed if the increase in noise level was not significant and /or the added noise level at sensitive receivers could be partially mitigated through other means. (See table L-1).

- With regard to the potential for Visual Impacts, the physical aspects of the added lanes in Alternative Packages B and D would affect approximately 20 segments, and Alternative C would affect 13 segments. Adjustments were made to preserve the existing vegetation to the greatest extent feasible either through freeway centerline shifts or through the provision of replacement landscaping. A 6-foot landscaped median was assumed for this study and would be provided in most of the 20 segments. This would be contingent upon adequate inside shoulders being provided to maximize future maintenance worker safety. A centerline shift towards the UP ROW is assumed for seven of the 20 segments in Alternatives B and D, and two of the 13 segments in Alternative C. In these cases, one side of the freeway would remain untouched, a new 6-foot landscaped median would be provided, and the existing visual buffer on the southbound side between the freeway and the UPRR would be reduced or eliminated. In the remaining segments, it is presumed that the freeway would be widened symmetrically. In some cases, there would be no noticeable impact or only a minor impact to outside vegetation. In most cases, the existing vegetation on both sides of the freeway would be reduced and/or replaced leaving a thin visual buffer on either side. In a few segments, where it is particularly tight (e.g., Olive Mill Rd. to Sheffield Drive), landscaping in the median and most of the vegetation on the outsides of the freeway would need to be eliminated to avoid impacts to adjacent properties. These alternatives would also entail the provision of sound walls on both sides of the freeway next to sensitive receivers where none currently exist. These added noise barriers would be visually intrusive to both residents and motorists. HOV and HOT lanes (Alternatives B and C) require a buffer between them and the general purpose lanes which result in a somewhat wider cross-section than when adding a general purpose lane (Alternative D). Design exceptions to permit a reduced cross-section and/or context sensitive design elements will need to be considered to help reduce the visual impacts in the particularly tight areas. See Table M-1).
- The regional Air Quality analysis is being completed, but initial results indicate that while the VMT is expected to increase for all the Alternatives compared to the No Build, carbon monoxide (CO) levels are expected to decrease due to higher speeds on the roadway. Nitrogen dioxide (NO₂) levels are expected to increase due to both the increased VMT and the contribution from the diesel commuter rail locomotives. Particulate matter (PM₁₀) levels are expected to decrease slightly with Alternative B, remain unchanged with Alternatives A and C, and increase with Alternative D.

- The microscale Air Quality screening analysis at 34 selected intersections indicates that between 18 and 24 of the intersections would be congested (at LOS ‘E’ and ‘F’) and would need to be analyzed as potential “hot spots” that may exceed microscale air quality standards during an EIR/EIS. Alternative A would have 18 intersections, Alternative B would have 21 intersections, Alternative C would have 22 intersections, and Alternative D would have 24 intersections that would be potential “hot spots”. A LOS of E or F does not imply that the site will cause a hot spot violation of an air quality standard, it is only an indicator that the project could possibly have a negative effect on microscale air quality levels.
- From a neighborhood traffic impact standpoint, relieving congestion on the freeway mainline by adding capacity as in Alternatives B, C and D would result in higher volumes at the freeway ramps and result in a degradation of the LOS on many of the surface streets that intersect with these ramps. With Alternatives B, C and D, some parallel streets would have reductions in traffic compared to No-Build and Alternative A resulting from motorists being able to use the freeway who would otherwise use parallel surface streets. The net result would be that some residents would incur increases in traffic, while some others would have reductions depending on whether they are located on streets that intersect with freeway ramps or are parallel to the freeway.

III. Implementation Related Criteria – General Conclusions

Preliminary estimates of Capital Costs for widening of U.S. 101 are substantially higher (35%) than in the Round 2 evaluation of 8 Alternative packages reported on in May 2005. This resulted from refinements in the concept designs during this round of evaluation, more detailed information than before, and changes in the unit costs based on Caltrans input. For the lane additions the increase in cost is due mainly to the following items: Modifications to on-ramps to accommodate ramp metering; interchange reconstruction of the Sheffield Drive and Cabrillo/Hot Springs interchanges to eliminate the left-side ramps; and increased costs for retaining walls and ROW acquisition. (See the Preliminary Capital Cost Estimate Tables in Appendix B for Highway Widening). The Tables on the next page show the estimated Capital Costs and estimated Annual O & M Costs in millions of current (2005) dollars for each of the Alternative Packages. The capital costs are expressed as a range of costs to reflect different assumptions regarding contingencies and design features for highway widening.

ESTIMATED CAPITAL COSTS (in Millions of 2005 Dollars)

	Alternative A	Alternative B	Alternative C	Alternative D
Highway				
Construction	\$0	\$332 - 377	\$249 - 289	\$289 - 327
ROW	0	68 - 75	57 - 59	25 - 31
Design/Const Adm	0	135 -155	102 - 119	117 - 133
Contingency	0	54 - 213	41 - 166	48 - 179
<i>Subtotal</i>	\$0	\$589 - 820	\$449 - 633	\$478 - 671
Commuter Rail				
Constr & Equip	76	62	62	0
ROW	7	7	7	0
Design/Const Adm	7	7	7	0
Contingency	3	3	3	0
<i>Subtotal</i>	\$93	\$79	\$79	\$0
Other				
Bus Capital	6	9	9	13
ITS	28	28	28	28
<i>Subtotal</i>	\$34	\$37	\$37	\$41
TOTAL	\$127	\$705 - 936	\$565 - 749	\$519 - 712

**ESTIMATED ANNUAL NET OPERATING AND MAINTENANCE COSTS
(in Millions of 2005 Dollars)**

	Alternative A	Alternative B	Alternative C	Alternative D
Highway	0.0	3.2	2.8	3.2
Transit				
Commuter Rail	3.3	4.1	4.1	0.0
Commuter Express Bus	0.4	0.4	0.4	0.7
Demand Management	0.4	0.4	0.4	0.4
TOTAL	\$4.1	\$8.1	\$7.7	\$4.3

Net of 2030 Base Case (No-Build) for highways, transit and demand management. Transit O&M costs are net of fare revenue.

- Table Q-1 presents the Cost per Peak Hour of Delay Reduced, and shows that Alternative A actually achieves the best ratio using these factors, mostly because the costs to implement

and operate it are so much less than the highway widening alternatives. These costs are in line with the modest level of congestion relief offered with Alternative A. While the other alternatives offer much greater delay reduction, their costs to implement and operate are also much greater. Alternatives B, C and D are similar in the level of cost per peak hour of delay reduced using this formula.

- A full benefit/cost analysis is beyond the scope of this corridor study. The cost per peak hour of delay reduced should therefore not be taken as indicative of cost-effectiveness since it does not reflect other benefits that are expected to accrue from travel time savings, reduced accident costs, reduced fuel consumption, reduced parking costs due to diversions to transit and HOVs, or the effects on the economy of each of the alternative packages. Benefits in reducing week-end congestion are also not reflected. All of these would point to benefits of Alternatives B, C and D compared to Alternative A.
- From the standpoint of Phaseability, measured by the independent utility of individual elements and ability to phase major elements, Alternative Packages A (Commuter Rail), B (HOV/HOT Lanes + Commuter Rail) and C (HOV/ Auxiliary Lanes + Commuter Rail) would be the easiest to phase. Alternative Package D would be the most difficult. (See Table V-1)
 - Providing that Union Pacific would not require double-tracking or other expensive improvements to the tracks before allowing commuter rail service, minimum construction would be required for start up of commuter rail service in Alternatives A, B and C. The time constraints would be more related to obtaining approvals from UPRR and others and time needed to purchase and receive rail cars and locomotives and to making spot location improvements. Obtaining approvals from UPRR could result in significant delay in the time needed to implement commuter rail service. Cars can be added to trains and more trains added to the schedule to phase over time as demand warrants. TDM measures could be implemented in advance of the commuter rail service. Even though more service could be added and trains made longer, the limitation as far as phaseability of Alternative A is the inelasticity in the number of people willing to or capable of diverting from autos to commuter rail.
 - Since they include a combination of transportation demand, transit and highway related components, Alternatives B and C can be phased over time starting with the TDM measures, followed by commuter rail service which would help relieve congestion while additional capacity is added to Highway 101. The highway widening will require continuity over a sufficient length of 101 for the new lanes to be effective. The existing 4-lane section south of Milpas to the County Line would be the logical place to begin the widening. Spot widening in the existing 6-lane section could occur concurrently or subsequently.
 - Unlike Alternatives B and C, Alternative D does not include a transit component independent of the freeway, since it relies on commuter express buses on 101. This package can be phased over time starting with the TDM measures, but then requires additional capacity being added to Highway 101, starting with widening from Milpas to the County Line.

- As far as the various Transportation Demand Measures included in the alternative packages, a comprehensive flexible work schedule program could have the greatest impact on reducing recurrent peak hour congestion at relatively low cost. Individualized marketing could also be effective, but is comparatively more costly to implement.
- Controlling the amount of parking in Downtown Santa Barbara and/or using pricing incentives to encourage off-peak arrivals and departures would need to be done in a modest way so as not to affect businesses. As a result the relative impact on reducing congestion would also be modest.
- While the number of people projected to be attracted would be relatively small, reducing the vanpool fees by 20% would be a relatively cost effective way to get some people out of their cars. Additionally, consideration should be given to a carpool incentive program similar to those used in San Luis Obispo, Birmingham, L.A., Riverside, and San Bernardino Counties and Atlanta whereby commuters are paid \$1-2 per day to try carpooling for up to three months. These trial incentive programs have been shown to be very effective and even cost effective.
- Increasing bus service would be more effective than reducing bus fares for attracting riders to express buses.
- Ramp metering can be an effective means of providing more stable flow to a freeway, but can only be implemented where the ramps are sufficient in length, width, and grade. On-Ramp locations where projected ramp volumes indicate that widening would be needed, are reflected in the cost estimates. There are other ramps in the corridor that do not presently have sufficient length for ramp metering, that would have to be modified as well.
- Intelligent Transportation System (ITS) elements would be comparatively cost effective in providing congestion relief.

Conclusions

Conclusions that can be drawn from the technical evaluation are:

- Based on the transportation performance and land use sensitivity analysis it is evident that widening of Highway 101 south of Milpas is needed now and will be needed more in the future if severe congestion is to be avoided. Even with implementation of the proposed TDM measures, operational improvements, and addition of commuter rail, widening would be needed. Without widening, stop-and-go congestion would not only occur during the peak hours, but it would extend to adjacent hours such that severe congestion would be continuous daily from 7:00 AM to 8:00 PM. Even assuming constrained population and employment growth in the South Coast, the land use sensitivity analysis indicates that widening of Highway 101 south of Milpas will be needed in the future.

- Commuter rail service from Ventura County to Santa Barbara and Goleta would attract a substantial number of motorists out of their cars and serve as an alternative to Highway 101, particularly while the additional lanes were being constructed. Implementing commuter rail service will require lead time to obtain approvals and enter into operating agreements with UPRR and Ventura County, secure funding, construct the necessary capital improvements and purchase rolling stock before this service can begin. Realistically, this may take 4-5 years to accomplish.
- Improvements to many of the freeway ramps and intersections at the ends of these ramps will be required.
- There are a number of Transportation Demand Management (TDM) and operational improvements that can be implemented at relatively low cost that will help to reduce congestion early on and in the long-term. Some of these can be early start projects and serve to relieve congestion until more capital intensive improvements are implemented. They include:
 - TDM
 - Adjustments to work schedules (FlexWork and FlexTime)
 - Individualized marketing
 - Ridesharing pricing incentives (Reducing vanpool fees and reimbursements for carpooling)
 - Variable parking rates at public lots and garages
 - Increased transit service
 - Bus priority on selected streets
 - Voluntary adjustments to freight delivery hours
 - Operational Improvements
 - Ramp Metering
 - Intelligent Transportation Systems (surveillance and communications)
 - Ramp improvements and auxiliary lanes at bottleneck locations
- HOV lanes instead of HOT lanes are recommended for new lanes. Also, more people would be served by the added capacity with new HOV lanes than with new general purpose lanes. The projected usage of the HOV lanes would be substantial and would meet Caltrans warrants. The conditions which must be present for high occupancy toll (HOT) lanes to be financially successful are not projected to be present in the 101 corridor. Whether the HOV lanes are HOV lanes all day or peak period HOV and off-peak general purpose lanes needs further analysis.
- Widening of Highway 101 could result in substantial impacts to the natural and built environment. Steps should be taken to design and construct the widening to minimize these impacts. Some ways to minimize these impacts include:
 - Avoiding displacement of residents and businesses

- Adjusting the centerline of the freeway to avoid significant environmental constraints
 - Maintaining a reduced landscaped median to the maximum extent possible (6 foot is assumed) in areas where adequate shoulders can be constructed to assure maximum safety for future maintenance workers.
 - Considering reduced cross-section width involving design exceptions from applicable design standards at the most restricted locations where appropriate and only after adhering to the design exception process that requires that there be no compromise of safety of any stakeholder group.
 - Maintaining landscaping to the maximum extent possible on both sides of the freeway in accordance with the *101 Design Guidelines for the South Coast*, including replacement landscaping where existing landscaping needs to be reduced
 - Giving the affected communities the option of sound walls where noise criteria indicate that there will be a sufficient increase in noise levels at sensitive receivers to warrant consideration of sound walls. Where implemented, these sound walls would significantly improve noise conditions for neighborhoods already impacted by freeway noise, but are considered by some communities as visually obtrusive. “Green walls” (ivy covered sound walls) have been an acceptable solution in some communities for resolving the trade-off between noise or visual affects.
 - Using design elements that preserve the unique character of the corridor while meeting all applicable safety, operational and maintenance requirements.
- With regard to the existing 6-lane section of Highway 101, only the addition of full lanes as currently reflected in Alternatives B or D could potentially fully resolve projected 2030 congestion. (And even these alternatives would require some further capacity at certain locations). Some combination of adding full lanes and/or auxiliary lanes only where needed to resolve the major bottlenecks, while avoiding significant environmental impacts is another, albeit lesser option from a transportation performance perspective. Whether full lanes or auxiliary lanes are needed should be determined by more detailed capacity and weave analyses.
 - The existing 4-lane sections of 101, in both directions between Fairview Avenue and Los Carneros Road and between Los Carneros Road and Glen Annie Road warrant consideration for operational improvements. Whether full lanes or auxiliary lanes are needed should be determined by more detailed capacity and weave analyses.
 - The land use sensitivity modeling suggests that reductions in growth assumptions could lessen the need for freeway capacity improvements north of Milpas. This issue could be revisited in the future to take into account changes in land use plans and policies by the County, City of Goleta and UCSB prior to undertaking major capital projects.