



RESOLUTION ADOPTING THE FINAL FREEWAY CORRIDOR MANAGEMENT STUDY PHASE 2 REPORT, AUTHORIZE THE EXECUTIVE DIRECTOR TO AMEND COOPERATIVE AGREEMENT NO. 04-2647 WITH THE CALIFORNIA DEPARTMENT OF TRANSPORTATION FOR THE U.S. 101/I-280 MANAGED LANES FOR AN ADDITIONAL \$152,000 IN A TOTAL AMOUNT NOT TO EXCEED \$227,000, AND APPROVE A PROP K/LOCAL PARTNERSHIP PROGRAM FUND EXCHANGE FOR THE U.S. 101/I-280 MANAGED LANES PROJECT,

WHEREAS, The 2013 San Francisco Transportation Plan (SFTP) identified the need for a freeway corridor management strategy to manage expected future growth in travel along, and raise the performance of, the US-101 and I-280 corridors; and

WHEREAS, The San Francisco Freeway Corridor Management Study (FCMS) is a performance-based assessment of strategies that is focused on producing near and mid-term recommendations for implementation in the next five to ten years; and

WHEREAS, The FCMS has two phases, and Phase 1 set the foundation for the technical analysis in Phase 2; and

WHEREAS, Phase 1 proposed a goals-based evaluation framework for the subsequent technical analysis, and identified the range of potential freeway management strategies to be analyzed; and

WHEREAS, Phase 2 involved the performance-based technical analysis of three operational scenarios and a no-build scenario, and produced a recommended freeway corridor management strategy and implementation plan; and

WHEREAS, Phase 2 results in a staff recommendation of High Occupancy Toll Lane with 3 or more persons (HOT3+) for further study as summarized in the attached final report; and

WHEREAS, In December 2017, through Resolution 18-25, the Transportation Authority



Board unanimously approved the appropriation of \$200,000 in Prop K sales tax funds to fund the next phase of the U.S. 101/I-280 Managed Lanes project, which will produce of the Project Study Report/Project Development Support (PSR/PDS) report as required by the California Department of Transportation (Caltrans) for projects that affect the state highway system; and

WHEREAS, In order to advance the project, Cooperative Agreement No. 04-2647 must be executed with Caltrans; and

WHEREAS, Cooperative Agreement No. 04-2647 defines the responsibilities for both the Transportation Authority and Caltrans for project development work required for the project; and

WHEREAS, The Transportation Authority is responsible for all project costs, including preparation of the PSR/PDS report, and reimbursement to Caltrans for review and approval of the PSR/PDS; and

WHEREAS, Budget for services identified in this agreement will be provided by Prop K sales tax funds appropriated through Resolution 18-25, \$500,000 in Congestion Management Agency planning funds, and an additional \$750,000 in Measure A transportation sales tax funds provided through a funding agreement with San Mateo County Transportation Authority (SMCTA); and

WHEREAS, Sufficient funds for Fiscal Year 2018/19 project activities are included in the proposed Fiscal Year 2018/19 budget; and

WHEREAS, On April 28, 2017, the Governor of California signed the Road Repair and Accountability Act of 2017, also known as Senate Bill (SB) 1, a transportation funding package of more than \$50 billion over the next 10 years that increases funding for local streets and roads, multi-modal improvements, and transit operations; and

WHEREAS, SB 1 created the LPP and appropriates \$200 million annually to be allocated by the California Transportation Commission (CTC) to local or regional agencies that have sought and received voter approval of or imposed fees solely dedicated to transportation; and



WHEREAS, On October 18, 2017, the CTC adopted program guidelines that allocate 50% of the program (\$100 million annually) through a Formulaic Program to local or regional transportation agencies that sought and received voter approval of transportation sales tax, tolls, or fees; and

WHEREAS, the San Francisco County Transportation Authority (Transportation Authority) administers Proposition K, a half-cent local transportation sales tax program approved by San Francisco voters in November 2003, and Proposition AA, an additional \$10 vehicle registration fee approved by San Francisco voters in November 2010, both with revenues dedicated to fund transportation investments as outlined in the corresponding voter approved Expenditure Plan; and

WHEREAS, On December 6, 2017 the CTC adopted LPP Formulaic Program formula share distributions for Fiscal Years (FYs) 2017/18 and 2018/19 and the Transportation Authority's share is estimated to be \$4.189 million (\$2.106 in FY 2017/18 and \$2.083 in FY 2018/19); and

WHEREAS, Transportation Authority staff identified SFPW's street resurfacing projects shown in Attachment 1 as good candidates for LPP funding given the steady pipeline of construction ready projects, the size of the projects being a good match with the anticipated size of the Transportation Authority's LPP formula shares, and sufficient Prop K to provide the dollar for dollar local match requirement; and

WHEREAS, On October 24, 2018, the Transportation Authority's Citizens Advisory Committee was briefed on the Phase 2 Report, the Co-operative Agreement, and the Funding Exchange, and adopted a motion of support for these three actions; now, therefore, be it

RESOLVED, That the Transportation Authority hereby adopts the attached Final Freeway Corridor Management Study Phase 2 Report; and be it further

RESOLVED, That the Executive Director is hereby authorized to prepare the document for final publication and distribute the document to all relevant agencies and interested parties; and be it further

RESOLVED, That the Transportation Authority authorizes the Executive Director to



approve an amendment to Cooperative Agreement No. 04-2647 with the California Department of Transportation for the U.S. 101/I-280 Managed Lanes project in the County of San Francisco and part of San Mateo County for an additional amount of \$152,000 and a total amount not to exceed \$227,000; and be it further

RESOLVED, That the Transportation Authority approves a Prop K/Local Partnership Program Fund Exchange of up to \$4.1 million in Prop K funds for the U.S. 101/I-280 Managed Lanes Project.

Attachment:

1. Prop K/LPP Fund Swap Details

Enclosure:

San Francisco Freeway Corridor Management Study Phase 2 Report

Attachment 1. Prop K/Local Partnership Program (LPP) Fund Exchange

Table 1. Status of LPP Formulaic Programming for San Francisco Public Works' Street Resurfacing Projects as of October 18, 2018

Project Name	Programming Year	Status	Total LPP Amount	Cumulative LPP Amount
Parkmerced/Twin Peaks/Mt Davidson Manor Residential Street Resurfacing	FY17/18	Allocated	\$ 2,106,000	\$ 2,106,000
Alemany Blvd Pavement Renovation	FY18/19	Programmed ¹	\$ 1,750,000	\$ 3,856,000
Sunset and Parkside Residential Streets Pavement Renovation	FY19/20	Programmed	\$ 2,340,000 ²	\$ 6,196,000
Total			\$ 6,196,000	

¹ Allocation request is awaiting California Transportation Commission action at its December 5-6, 2018 meeting.

² Of the total amount, \$333,000 correspond to Cycle 1 funds that were reprogrammed from the Alemany Blvd Pavement Renovation project.

Table 2. Proposed Fund Exchange Scenarios¹

Scenario	SFPW Street Resurfacing LPP Funds	SFCTA US101/I280 Managed Lanes Prop K Funds ²	Notes
Scenario 1 Prop 6 fails, SB 1 revenues remain SFPW retains all LPP funds	\$6,196,000	\$4,100,000	
Scenario 2 Prop 6 passes, SB 1 revenues are repealed and SFPW retains first two years LPP funds	\$4,189,000 ³	\$2,500,000	Staff would seek amendment of the Street Resurfacing 5YPP to advance \$2.0 million to fully fund the Sunset/Parkside project.
Scenario 3 Prop 6 passes, SB 1 revenues are repealed and SFPW only retains first year LPP funds	\$2,106,000	\$1,200,000	Staff would seek amendment of the Street Resurfacing 5YPP to advance \$4.6 million to fully fund Alemany and Sunset/Parkside.

¹ Acronyms include: 5YPP – Prop K 5-Year Prioritization Program, LPP – Local Partnership Program, SB 1 – Senate Bill 1, SFCTA – San Francisco County Transportation Authority, and SFPW – San Francisco Public Works

² Should the Transportation Authority Board approve the fund exchange, we anticipate returning to the Board in January 2019 to amend the Prop K Strategic Plan and the Street Resurfacing 5YPP to program the Prop K funds to the US101/I280 Managed Lanes – Fund Exchange project, concurrent with seeking allocation of those funds.

³ This amount includes \$333,000 in Cycle 1 funds that are currently programmed to the Sunset/Parkside Pavement Renovation project.



Memorandum

Date: October 31, 2018
To: Transportation Authority Board
From: Eric Cordoba – Deputy Director Capital Projects
Subject: 11/13/18 Board Meeting: Adopt the Final Freeway Corridor Management Study Phase 2 Report, Authorize the Executive Director to Amend Cooperative Agreement No. 04-2647 with the California Department of Transportation for the U.S. 101/I-280 Managed Lanes for an Additional \$152,000 in a Total Amount Not to Exceed \$227,000, and Approve a Prop K/Local Partnership Program Fund Exchange for the U.S. 101/I-280 Managed Lanes Project

<p>RECOMMENDATION <input type="checkbox"/> Information <input checked="" type="checkbox"/> Action</p> <ul style="list-style-type: none"> • Adopt the Final Freeway Corridor Management Study (FCMS) Phase 2 Report • Approve an Amendment to Cooperative Agreement No. 04-2647 with the California Department of Transportation for the U.S. 101/I-280 Managed Lanes project in the County of San Francisco and part of San Mateo County for an additional amount of \$152,000 and a Total Amount Not to Exceed of \$227,000 • Approve a Prop K/Local Partnership Program (LPP) Fund Exchange of up to \$4.1 million in Prop K funds for the U.S. 101/I-280 Managed Lanes Project <p>SUMMARY</p> <p>We last brought an update on our San Francisco managed lanes planning work in April 2018, focusing on potential physical and operational alternatives and their preliminary results. We have completed additional analysis as requested by the Board and are ready to present final results and recommendations. We are also requesting Board approval to amend an existing Cooperative Agreement with Caltrans to continue the current Project Initiation Document (PID) phase effort, as well as approval of a fund exchange with San Francisco Public Works (SFPW) of up to \$4.1 million in Prop K funds with Senate Bill 1 (SB 1) LPP program funds that we programmed to SFPW street resurfacing projects. The fund exchange would support future preliminary engineering and technical studies including robust traffic and equity analyses for the U.S. 101/I-280 Managed Lanes project. The exchange is an “up to” amount since Prop 6 is on the November 6 ballot and, if it passes, would repeal SB 1 revenues, including the state gas tax.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Fund Allocation <input checked="" type="checkbox"/> Fund Programming <input type="checkbox"/> Policy/Legislation <input checked="" type="checkbox"/> Plan/Study <input type="checkbox"/> Capital Project Oversight/Delivery <input type="checkbox"/> Budget/Finance <input checked="" type="checkbox"/> Contract/Agreement <input type="checkbox"/> Other: <hr/>
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DISCUSSION

Background.

The FCMS (or Study) is a high-level feasibility study and assessment of freeway management strategies for improving travel time and reliability for travelers on U.S. 101 and I-280 in San Francisco. The Study is focused on producing near and mid-term recommendations for implementation in the next five to ten years. The need for the Study was identified in the 2013 San Francisco Transportation Plan, which forecasts a continued increase in demand for travel by San Francisco residents, visitors, and workers to and from Downtown and the Eastern Neighborhoods, as well as the Peninsula and South Bay. Introducing active transportation management strategies to existing freeways can help move both current and future travelers in the corridor more reliably and efficiently. Recognizing this, the Board adopted the FCMS Phase 1 report in January of 2015. Phase 1 established the study's purpose and need and goals framework centering on the need for increased person-throughput and reliability, while utilizing the existing right of way and minimizing impacts to local communities. The Phase 1 report also identified a range of strategies for performance-based assessment in Phase 2.

Carpool lanes are already in operation on U.S. 101 from Morgan Hill to Redwood City, covering about 42 miles along the Peninsula, primarily in Santa Clara County. Caltrans and San Mateo County are currently in the environmental assessment phase of a project to extend managed lanes on U.S. 101 from Redwood City to the I-380/U.S. 101 interchange, approximately 14 miles. We are collaborating with the San Mateo City and County Association of Governments (C/CAG) and the San Mateo County Transportation Authority (SMCTA) to study managed lanes north of I-380 on U.S. 101 in San Mateo county and into San Francisco and have participated in the 3-county Caltrans corridor study for the U.S. 101 corridor from Santa Clara to San Francisco.

Alternatives.

A detailed description of the study alternatives initially presented at the April 2018 Board meeting, including physical description and potential operational policies, is included as Attachment 1.

In summary, the four alternatives evaluated for a 2020 timeframe were:

- No Build, where the configuration of freeways remains as it is today. This serves as a point of comparison for the following three build scenarios.
- High Occupancy Vehicle (HOV) with a two-person minimum requirement (HOV2+).
- HOV with a three-person minimum requirement (HOV3+).
- Express Lane with a three-person minimum requirement to access the lane at no cost and a demand based, variable toll for others to access the lane (High Occupancy toll or HOT3+).

In response to concerns voiced by Board members in April 2018 and in pursuit of the City's Transit First policies, improvements and additions to Muni and SamTrans service were included in all build scenarios. Muni service includes an enhancement to the 8BX service to run all day and take advantage of the lanes within San Francisco, as well as the addition of the Hunters Point Express and Candlestick Express service, currently planned to come online as development in each neighborhood proceeds, thereby serving both new and existing residents. Improved SamTrans service is based on the early findings of the in-progress U.S. 101 Express Bus Feasibility Study, and was modeled to include eight new express routes that serve both San Mateo County resident trips to San Francisco and San Francisco trips to job centers in San Mateo County.

Feasibility Analysis Results.

Details of the analysis methodology and results are included in Attachment 1. A summary by alternative follows.

No Build Scenario

Under the No-Build scenario (year 2020), congestion continues to get worse, with some bottlenecks resulting in an additional 2 to 5 minutes of travel time over existing conditions, doubling existing delays. Despite this, there remains no incentive to use transit or carpool in the corridor, as both buses and carpools remain subject to these increasing delays.

HOV2+ Scenario

In the HOV2+ Scenario, analysis results indicate that the carpool lane will be congested (especially when average 20% occupancy violation rates are included) between the U.S. 101/I-380 interchange and downtown San Francisco compared to the No-Build scenario. In the general purpose lanes, delays increase by about two to three minutes in both the morning and evening in all directions except northbound in the a.m. peak hour, where travel times decrease by about two minutes. The HOV2+ Scenario has the least potential for growth in carpools and transit use since it will likely be full at the outset and is also not compatible with how the SM-101 Managed Lane will be operated, which could cause adverse operational impacts and enforcement challenges with going from 3+ to 2+. Additionally, the Transportation Authority Board also expressed a preference to avoid use of the lanes by Transportation Network Companies or TNCs (e.g., Uber and Lyft) that included only a driver and one passenger, a situation that would be legal under this policy.

HOV3+ Scenario

In the HOV3+ Scenario, initial analysis results indicate that the carpool lane will be free flowing and well under capacity, saving travelers in those lanes between 4 and 9 minutes between the U.S. 101/I-380 interchange and downtown San Francisco compared to the No-Build scenario. The carpool lane provides an incentive to use transit and carpool, however with fewer 3+ person carpools forming under this scenario than there is lane capacity in the carpool lane, the remaining general purpose lanes remain significantly congested, thus moving fewer vehicles and people overall. In the general purpose lanes, delays increase by about 6 to 14 minutes in both the morning and evening in all directions except northbound in the a.m. peak hour, where travel times decrease by about two minutes.

HOT3+ Scenario

In the HOT3+ Scenario, analysis results indicate that the Express Lane will be free-flowing, saving travelers in those lanes between 4 and 9 minutes between the U.S. 101/I-380 interchange and downtown San Francisco compared to the No-Build scenario, and can be actively managed through adjustments to pricing to maintain vehicle throughput just below capacity. In the general purpose lanes, delays increase by about 2 minutes in the northbound direction in the evening and 4 minutes in the southbound direction in the morning, while saving general purpose lane users about 3 minutes in both the northbound direction in the morning and the southbound direction in the evening.

Additional Policy Considerations

In addition to the transportation performance results of this feasibility analysis, regional policy conversations and consistency of driver experience factors also point to the need to look more critically at an HOV2+ scenario. The two existing carpool facilities into and out of San Francisco, the Bay Bridge and Golden Gate Bridge, both require 3 person or more carpools today. Additionally, Caltrans and MTC are currently leading an effort to increase the carpool occupancy requirement on

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I-880, CA 237, and U.S. 101 in Alameda and Santa Clara counties to 3+ under an Express Lane Scenario, and San Mateo County's preferred alternative for implementation of Express Lanes on U.S. 101 as far north as I-380 is also 3+ occupancy. Adopting a different occupancy policy along a single corridor or connected facility could create significant driver confusion, traffic operations, and occupancy enforcement difficulties.

Feasibility Study Recommendations.

HOT3+ is the recommended option for further analysis because it strikes the best balance amongst various factors (time savings incentives, opportunities to increase transit ridership and ridesharing, and the impact on the general purpose lanes) while advancing the goals of this study, and warrants more detailed evaluation in subsequent project phases. HOV3+ creates substantial additional congestion in the corridor, reduces person throughput, and HOV2+ is inconsistent with regional and corridor policy and will likely not achieve the outcomes calculated by this feasibility analysis in real-world conditions (for example, given some additional percentage of "cheaters" in the carpool lane). We recommend not advancing HOV2+ and HOV3+ scenarios for further study.

Outreach.

The study team has met with numerous community, advocacy, and business groups to introduce and hear feedback on the concept of a freeway management strategy in San Francisco, including the potential for Express Lanes. At this feasibility phase of the project, the outreach strategy was focused on educating stakeholders about the project and the concepts under evaluation while collecting questions and concerns that are important to community members. These included concerns about socio-economic equity, the potential for diversions, and adequacy of transit options in the affected corridors. As a result of Board and community feedback, project staff propose to conduct more detailed equity analyses and multimodal traffic studies, and include additional improvements to transit as priorities should the study move into subsequent phases of environmental review and design.

In addition to public outreach, in October, Transportation Authority staff and Board members together with staff and leaders from San Mateo county, participated in a study tour of a HOT lane facility in Los Angeles operated by Metro, Los Angeles County's Congestion Management Agency. This was followed by a roundtable discussion on equity and pricing with Metro leadership and staff as well as a university researcher in the field. Metro staff were able to provide valuable information about the planning, development, and operation of a freeway management program, particularly including strategies and policies to address concerns of low-income travelers. Learnings from this visit will inform our proposed equity analysis in the next phase of work.

Caltrans Cooperative Agreement Amendment.

The Transportation Authority entered into a limited Cooperative agreement with Caltrans for up to \$75,000 in July 2018, for reimbursement of their services in the PID phase. The total cost of Caltrans services is \$227,000. At this time, we would like to amend this agreement for the full amount to reimburse Caltrans for their services during this phase of the project.

Cooperative Agreement No. 04-2647 defines the responsibilities for both the Transportation Authority and Caltrans for project development work required for the U.S. 101/I-280 Managed Lanes project. Government Code section 65086.5 authorized Caltrans to review and approve PIDs prepared by local agencies as reimbursed work. The culmination of this phase of work will be approval of the PID document, namely a Project Study Report/Project Development Support (PSR/PDS), and hence approval to move into the environmental clearance phase. The Transportation Authority is responsible for preparation of the PSR/PDS and reimbursement to Caltrans for staff review time.

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Project costs will be shared between the Transportation Authority and the SMCTA. The SMCTA is covering the costs associated with the portion of the project that is in San Mateo county extending from the U.S. 101/I-380 interchange near San Francisco International Airport to the San Francisco county line.

The overall project budget for the current PID phase of work is \$1,450,000. We have secured full funding for this phase including \$200,000 from Prop K, \$500,000 in Congestion Management Agency (CMA) planning funds, and an additional \$750,000 in Measure A transportation sales tax funds provided through a funding agreement with SMCTA.

Prop K/Local Partnership Program Fund Exchange.

In December 2017 the Transportation Authority Board approved \$6 million in LPP Formulaic Program funds for SFPW's street resurfacing projects, but deferred action on a proposed fund exchange of \$4.1 million in Prop K funds for the US101/I-280 Managed Lanes project. As administrator of the Prop K sales tax program, we receive about \$2.1 million annually from the LPP Formulaic Program, which was established by SB 1 in 2017. This \$6 million covers the first three years of the LPP and programming is subject to approval by the California Transportation Commission (CTC).

Concurrent with seeking approval of the project feasibility study, we are now seeking approval of the Prop K/LPP fund exchange to enable preliminary engineering and an equity analysis of the proposed Project. Given the uncertainty created by Prop 6, which would repeal the SB 1 revenues that fund the LPP, we have developed, together with SFPW, three scenarios for the fund exchange described in Attachment 2. The amount available for the managed lanes project ranges from \$4.1 million to \$1.2 million depending on whether Prop 6 fails (in which case \$4.1 million will be available for the project) or if it passes, how much of the \$6 million SFPW will retain. If Prop 6 passes, we will seek Board approval to advance Prop K street resurfacing funds to ensure that the three street resurfacing projects SFPW plans to fund with the \$6 million in LPP funds are fully funded.

Next Steps.

As noted above, we have started development of the Caltrans scoping document (PID) and anticipate completing this phase of work by Spring of 2019. Subsequent phases of the project include development of a full program of multimodal system and demand management strategies, including increased transit service, low-income assistance programs, ride matching, hours of operation, and many other policies to be paired with any potential implementation of the physical components currently under investigation. Additional policy considerations beyond occupancy for the managed lane that need to be considered before implementing this project could include statewide or even national policies pertaining to lane conversion of general purpose lanes to managed lanes, local or regional policies around private shuttle use of managed lanes, and local San Francisco policy around TNC use of managed lanes.

Should the Board approve the fund exchange described above, we will return to the Board in early 2019 to program and allocate the funds to the Project. We will also seek collaboration and matching contributions for next phase work from private employers, similar to San Mateo's approach. This funding will allow the project team to conduct the environmental document-level traffic analysis for the range of alternatives resulting from the PID phase, as well as conduct a robust equity analysis to determine the extent of low-income traveler impacts and how these can be mitigated.

In addition, future phases of this project are anticipated to be very competitive for receiving funds from programs like the SB 1 Solutions for Congested Corridors Program, which names the U.S.

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101/Caltrain corridor connecting Silicon Valley with San Francisco as one of five named targeted corridors in the enabling legislation, as well as Regional Measure 3 bridge tolls since the project is part of a regional network of Express Lanes prioritized by the MTC.

FINANCIAL IMPACT

Budget for services identified in Cooperative Agreement No. 04-2647 will be provided for by Prop K sales tax funds appropriated in December 2017 through Resolution 18-25, federal CMA planning funds, and Measure A sales tax funds from SMCTA. Amounts corresponding to this year's anticipated expenditures are included in the Transportation Authority's adopted Fiscal Year 2018/19 budget.

CAC POSITION

The CAC considered this item at its October 24, 2018 meeting and unanimously adopted a motion of support for the staff recommendation.

SUPPLEMENTAL MATERIALS

Attachment 1 – Alternatives Description and Analysis Result Details

Attachment 2 – Prop K/LPP Fund Swap Details

Enclosure – Freeway Corridor Management Study Phase 2 Draft Final Report

Attachment 1.

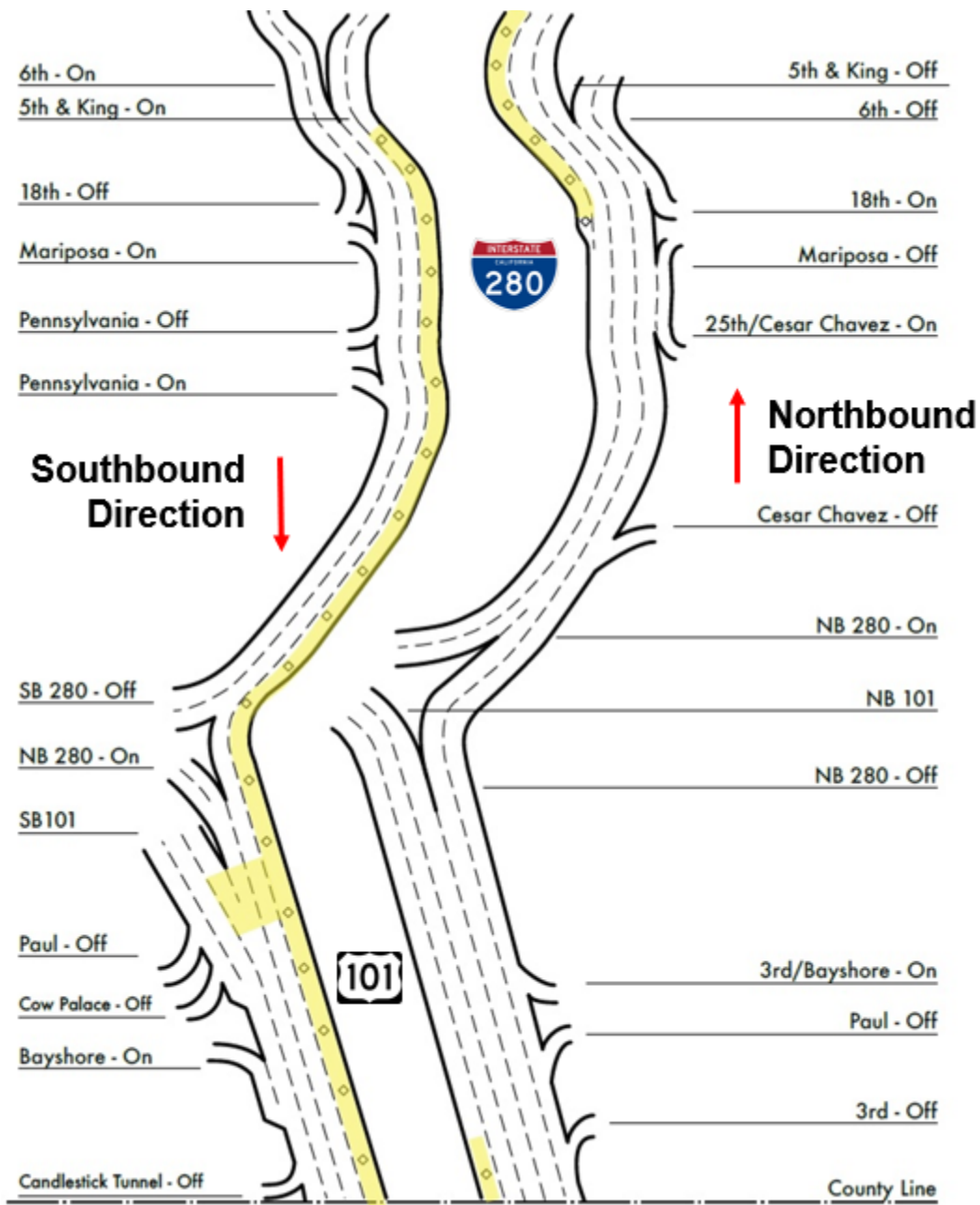
Alternatives:

The FCMS study is exploring options for dedicating a lane on portions of US 101 and I-280 for High-Occupancy Vehicles (carpools and transit). Consistent with other carpool lanes in the Bay Area, these lanes could have minimum occupancy requirements of either two or three persons. If deemed necessary, price management in the form of Express Lanes, also known as High Occupancy/Toll (HOT) lanes, could be used with either of these configurations. Express Lanes could provide the right tool to achieve a balance of traffic that gives buses, carpoolers, and other vehicles in the lane faster travel time and reliability without adding significant delay to the remaining general-purpose lanes. Express Lanes can give people a choice to get where they need to go faster and more reliably, with the price to enter for non-carpools determined by demand. Eligible carpools and buses would access the lane at no cost.

The FCMS study team collected information on operational and physical constraints on San Francisco's freeways and has determined that one potential feasible configuration could entail the features described below:

- Southbound, the existing configuration of the I-280 and US 101 freeways allows for the creation of a continuous lane by restriping the existing freeway. A carpool or Express Lane could operate along I-280 between the intersection of 5th and King Streets and US 101, continuing through the interchange to US 101 into San Mateo County, covering a distance of about five miles.
- Headed northbound, because I-280 exits from the right side of Northbound US 101, any carpool or Express lanes entering San Francisco from San Mateo county will likely end at or near the county line. However, the Study identified an opportunity to provide priority for Northbound carpools and buses for approximately one mile along the I-280 headed into South of Market, from about 18th Street to 5th Street.

Figure 1 includes a lane diagram figure illustrating this concept.



The operational scenarios considered with this physical alternative include:

- No Build, where the configuration of freeways remains as it is today. This serves as a point of comparison for the following three build scenarios.
- High Occupancy Vehicle (HOV) with a two-person minimum requirement (HOV2+).
- HOV with a three-person minimum requirement (HOV3+).
- Express Lane with a three-person minimum requirement to access the lane at no cost and a demand based, variable toll for others to access the lane (HOT3+).

Alternatives Evaluation:

The analysis was performed by determining the demand for travel across all modes and routes in each scenario in the Transportation Authority's travel demand model, SF-CHAMP, and then applying these

demands to a high-level, morning and evening peak hour traffic model. This analysis provided information about travel times and delays for both carpool/Express Lane users and non-users, estimates of the change in number of people moved through the corridor, and city/area-wide metrics like overall vehicle miles traveled and air quality impacts. The travel demand model does not take into account factors that may impact real world operation of a facility including potential violators, clean air vehicles, and variations in traffic volumes for special events.

Results of the operational analysis indicate technical feasibility of the proposed lane configuration (based on overall person throughput of the facility and level of delay to vehicles in general purpose lanes) under at least one of the three evaluated operational policies, and are summarized below and in Tables 1 and 2:

Under the No-Build scenario, congestion continues to get worse, with some bottlenecks resulting in an additional 2 to 5 minutes of travel time over existing conditions, doubling existing delays.

In all build scenarios for 2020, the model results show that the carpool or Express Lane will be free-flowing, saving travelers in those lanes between four and nine minutes between the I-380 interchange and down town San Francisco compared to the No-Build scenario. However, the impacts to the general purpose lanes and person throughput, or people moved in the corridor, would vary:

- HOV2+ increases delay to general purpose lane users by about two to three minutes in both the morning and evening in all directions except northbound, where travel times decrease by about two minutes. Person throughput at Harney and Mariposa Streets increases by between 600 to 1900 travelers, depending on direction and time of day, an increase of 13% to 43%.
- HOV3+ increases delay to general purpose lane users by about six to 14 minutes in both the morning and evening in all directions except Northbound, where travel times decrease by about two minutes. Person throughput at Harney and Mariposa Streets decreases in some times and directions as a result of significant new congestion, by between 500 and 1100 fewer travelers, or a reduction in 5% to 12%, while in other times person throughput increases by between 200 to 1600 travelers, an increase of 7% to 33%.
- HOT3+ increases delay to general purpose lane users by about two to four minutes in the northbound direction in the evening and southbound direction in the morning, while saving general purpose lane users about three minutes in the northbound direction in the morning and the southbound direction in the evening. Person throughput at Harney and Mariposa Streets increases by between 100 to 2200 travelers, depending on direction and time of day, an increase of 2% to 43%.

Table 1: Travel Time

Direction	Operational Scenario in 2020	AM Peak Hour		PM Peak Hour	
		GP Lane	Managed Lane	GP Lane	Managed Lane
Northbound I-380 to Downtown SF	No Build	24 minutes	-	20 minutes	-
	2-person carpool (HOV2+)	-2	-7	+3	-8
	3-person carpool (HOV3+)	-2	-7	+6	-9
	3-person carpool with option to buy into lane (HOT3+)	-3	-7	+2	-8
Southbound Downtown SF to I-380	No Build	17 minutes	-	15 minutes	-
	2-person carpool (HOV2+)	+2	-6	+2	-4
	3-person carpool (HOV3+)	+10	-6	+13	-4
	3-person carpool with option to buy into lane (HOT3+)	+4	-6	-3	-4

Table 2: Person Throughput

Segment	Screenline Location	Operational Scenario in 2020	AM	PM
US 101 NB	Between Harney Way off-ramp and Harney Way on-ramp (SF County Line)	2-person carpool (HOV2+)	+14%	+13%
		3-person carpool (HOV3+)	-12%	-9%
		3-person carpool with option to buy into lane (HOT3+)	+7%	+14%
US 101 SB	Between Bayshore Blvd on-ramp and Alana Way off-ramp (SF County Line)	2-person carpool (HOV2+)	+17%	+19%
		3-person carpool (HOV3+)	-5%	-8%
		3-person carpool with option to buy into lane (HOT3+)	+11%	+26%
I-280 NB	Between 18 th Street on-ramp and 6 th Street off-ramp	2-person carpool (HOV2+)	+40%	+18%
		3-person carpool (HOV3+)	+33%	+10%
		3-person carpool with option to buy into lane (HOT3+)	+24%	+8%
I-280 SB	Between 18 th Street off-ramp and 18 th Street on-ramp	2-person carpool (HOV2+)	+16%	+43%
		3-person carpool (HOV3+)	+7%	+19%
		3-person carpool with option to buy into lane (HOT3+)	+2%	+43%