Metropolitan Transportation Commission

Meeting Agenda

Bay Area Metro Center
375 Beale Street
San Francisco, CA 94105

Policy Advisory Council

Randi Kinman, Chair
Cynthia L. Murray, Vice Chair

Wednesday, November 13, 2019 | **1:30 PM** | **Board Room - 1st Floor**

This meeting is scheduled to be webcast live on the Metropolitan Transportation Commission's Website: http://mtc.ca.gov/whats-happening/meetings and will take place at 1:30 p.m.

1. 19-1191 Welcome

Action: Information

Presenter: Randi Kinman, Council Chair

2. Roll Call / Confirm Quorum

Quorum: A quorum of this council shall be a majority of its regular voting members (12).

3. 19-1192 Approval of October 9, 2019 Meeting Minutes
(5 minutes)

Action: Approval

Presenter: Randi Kinman, Council Chair

Attachments: 03_Council Minutes_Oct 2019.pdf

4. 19-1193 Subcommittee Reports
(5 minutes)

The subcommittee may refer an item from its agenda to the full Council for action at its next meeting if needed.

Action: Information

Presenter: Jim Blacksten, Subcommittee Chair

5. 19-1229 2020 Draft Joint Advocacy Program
(15 minutes)

Draft of the joint MTC/ABAG 2020 Advocacy Program.

Action: Information

Presenter: Rebecca Long

Attachments: 05_2020 Draft Joint Advocacy Program.pdf

6. 19-1194 Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results
(30 minutes)

Presentation on the draft results from the Project Performance Assessment, which evaluated approximately 100 projects against the three Futures to determine their cost-effectiveness, equity impacts, and alignment with Guiding Principles.

Action: Information

Presenter: Anup Tapase

Attachments: 06_Horizon_PBA2050-Draft Project Performance Assessment Results.pdf

7. 19-1196 Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience
(30 minutes)

Overview of the draft financial needs associated with transportation, affordable housing, and resilience for Plan Bay Area 2050, the next-generation regional plan.

Action: Information

Presenter: William Bacon, Dave Vautin, and Rachael Hartofelis

Attachments: 07_PBA 2050-Draft Needs Assessments for Transportation, Housing and Resili

8. 19-1197 Staff Liaison Report
(5 minutes)

Relevant MTC policy decisions and other activities.

Action: Information

Presenter: Marti Paschal, Staff Liaison

Attachments: 08_Staff_Liaison_Report Nov 2019.pdf

9. 19-1198 Council Member Reports
(10 minutes)

Members of the Council may report on locally relevant issues or events.

Action: Information

Presenter: Randi Kinman, Council Chair

10 19-1199 New Business
(5 minutes)

Members of the Council may bring up new business for discussion or addition to a future agenda.

Action: Discussion

Presenter: Randi Kinman, Council Chair

11. Public Comments / Other Business

12. Adjournment / Next Meeting

The next meeting of the Policy Advisory Council will be held Wednesday, December 11, 2019 at 1:30 p.m. at the Bay Area Metro Center, 375 Beale Street, San Francisco, CA.

Public Comment: The public is encouraged to comment on agenda items at Committee meetings by completing a request-to-speak card (available from staff) and passing it to the Committee secretary. Public comment may be limited by any of the procedures set forth in Section 3.09 of MTC's Procedures Manual (Resolution No. 1058, Revised) if, in the chair's judgment, it is necessary to maintain the orderly flow of business.

Meeting Conduct: If this meeting is willfully interrupted or disrupted by one or more persons rendering orderly conduct of the meeting unfeasible, the Chair may order the removal of individuals who are willfully disrupting the meeting. Such individuals may be arrested. If order cannot be restored by such removal, the members of the Committee may direct that the meeting room be cleared (except for representatives of the press or other news media not participating in the disturbance), and the session may continue.

Record of Meeting: Committee meetings are recorded. Copies of recordings are available at a nominal charge, or recordings may be listened to at MTC offices by appointment. Audiocasts are maintained on MTC's Web site (mtc.ca.gov) for public review for at least one year.

Accessibility and Title VI: MTC provides services/accommodations upon request to persons with disabilities and individuals who are limited-English proficient who wish to address Commission matters. For accommodations or translations assistance, please call 415.778.6757 or 415.778.6769 for TDD/TTY. We require three working days' notice to accommodate your request.

可及性和法令第六章：MTC 根據要求向希望來委員會討論有關事宜的殘疾人士及英語有限者提供服務/方便。需要便利設施或翻譯協助者，請致電 415.778.6757 或 415.778.6769 TDD / TTY。我們要求您在三個工作日前告知，以滿足您的要求。

Acceso y el Titulo VI: La MTC puede proveer asistencia/facilitar la comunicación a las personas discapacitadas y los individuos con conocimiento limitado del inglés quienes quieran dirigirse a la Comisión. Para solicitar asistencia, por favor llame al número 415.778.6757 o al 415.778.6769 para TDD/TTY. Requerimos que solicite asistencia con tres días hábiles de anticipación para poderle proveer asistencia.

Attachments are sent to Committee members, key staff and others as appropriate. Copies will be available at the meeting.

All items on the agenda are subject to action and/or change by the Committee. Actions recommended by staff are subject to change by the Committee.

MTC's Chair and Vice-Chair are ex-officio voting members of all standing Committees.

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1191	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Welcome				
Sponsors:					
Indexes:					
Code sections:					
Attachments:					

Date	Ver.	Action By	Action	Result

Subject:
Welcome

Presenter:
Randi Kinman, Council Chair

Recommended Action:
Information

Attachments:

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1192	**Version:**	1	**Name:**	
Type:	Minutes			**Status:**	Committee Approval
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Approval of October 9, 2019 Meeting Minutes (5 minutes)				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	03_Council Minutes_Oct 2019.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Approval of October 9, 2019 Meeting Minutes
(5 minutes)

Presenter:
Randi Kinman, Council Chair

Recommended Action:
Approval

Attachments:

Metropolitan Transportation Commission

Meeting Minutes - Draft

Bay Area Metro Center
375 Beale Street
San Francisco, CA 94105

Policy Advisory Council

Randi Kinman, Chair
Cynthia L. Murray, Vice Chair

Wednesday, October 9, 2019 **1:30 PM** **Board Room - 1st Floor**

1. 19-1031 Welcome

Action: Information

Presenter: Randi Kinman, Council Chair

2. Roll Call / Confirm Quorum

Present: 12 - Blacksten, Coates, Hedges, Kallins, Chair Kinman, Lee, Lopez, Madden, Momoh, Ozim, Schweng and Williams

Excused: 8 - Burnett, Castellanos, Cochran, Eldred, Levin, Mendoza, Vice Chair Murray and Saver

Absent: 2 - Florez and Hernandez

Councilmember Wolff submitted his resignation, effective immediately.

3. 19-1032 Approval of September 11, 2019 Meeting Minutes
(5 minutes)

Action: Approval

Presenter: Randi Kinman, Council Chair

Attachments: 03_Council Minutes_Sept 2019.pdf

Upon the motion by Hedges and second by Momoh, the September 11, 2019 Meeting Minutes were approved. The motion carried by the following vote:

Aye: 12 - Blacksten, Coates, Hedges, Kallins, Chair Kinman, Lee, Lopez, Madden, Momoh, Ozim, Schweng and Williams

Absent: 10 - Burnett, Castellanos, Cochran, Eldred, Florez, Hernandez, Levin, Mendoza, Vice Chair Murray and Saver

4. 19-1033 Subcommittee Reports
(5 minutes)

The subcommittee may refer an item from its agenda to the full Council for action at its next meeting if needed.

Action: Information

Presenter: Jim Blacksten, Subcommittee Chair

5. 19-1035 Horizon: Futures Final Report
(45 minutes)

Presentation on findings from the second and final round of Futures Planning, including recommendations of Horizon strategies resilient to future uncertainty which should be advanced into Plan Bay Area 2050.

Action: Information

Presenter: Michael Germeraad

Attachments: 05_Horizon_Futures Final Report.pdf

6. 19-1036 Transit Update: Rail Synthesis and Crossings
(30 minutes)

Highlights of the progress on regional rail over the past decade, including identification of potential next steps to improve the region's transit system and discussion of tradeoffs associated with a new Transbay Crossing.

Action: Information

Presenter: Adam Noelting and Anup Tapase

Attachments: 06_Regional Rail Planning Update.pdf
06_Correspondence_Regional Rail Planning Update.pdf

7. 19-1037 Staff Liaison Report
(5 minutes)

Relevant MTC policy decisions and other activities.

Action: Information

Presenter: Marti Paschal, Staff Liaison

Attachments: 07_Staff_Liaison_Report Oct 2019.pdf

8. 19-1038 Council Member Reports
(10 minutes)

Members of the Council may report on locally relevant issues or events.

Action: Information

Presenter: Randi Kinman, Council Chair

9. 19-1039 New Business
(5 minutes)

Members of the Council may bring up new business for discussion or addition to a future agenda.

Action: Discussion

Presenter: Randi Kinman, Council Chair

10. Public Comments / Other Business

11. Adjournment / Next Meeting

The next meeting of the Policy Advisory Council will be held Wednesday, November 13, 2019 at 1:30 p.m. at the Bay Area Metro Center, 375 Beale Street, San Francisco, CA.

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1193	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Subcommittee Reports (5 minutes) The subcommittee may refer an item from its agenda to the full Council for action at its next meeting if needed.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:					

Date	Ver.	Action By	Action	Result

Subject:
Subcommittee Reports
(5 minutes)

The subcommittee may refer an item from its agenda to the full Council for action at its next meeting if needed.

Presenter:
Jim Blacksten, Subcommittee Chair

Recommended Action:
Information

Attachments:

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1229	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/25/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	2020 Draft Joint Advocacy Program (15 minutes) Draft of the joint MTC/ABAG 2020 Advocacy Program.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	05_2020 Draft Joint Advocacy Program.pdf				

Date	Ver.	Action By	Action	Result

Subject:
2020 Draft Joint Advocacy Program
(15 minutes)

Draft of the joint MTC/ABAG 2020 Advocacy Program.

Presenter:
Rebecca Long

Recommended Action:
Information

Attachments:

Metropolitan Transportation Commission
Policy Advisory Council

November 13, 2019 **Agenda Item 5**

2020 Draft Joint Advocacy Program

Subject: Draft of the joint MTC/ABAG 2020 Advocacy Program.

Background: Policy Advisory Council Agenda Item 5, 2020 Draft Joint Advocacy Program is attached. This report will be presented to the Joint MTC Legislation Committee and ABAG Legislation Committee on November 8, 2019.

Staff will be at your November 13 meeting to discuss this report. The Council's input is requested.

Attachments: Agenda Item 4b from the November 8, 2019 Joint MTC Legislation Committee and ABAG Legislation Committee

Metropolitan Transportation Commission and Association of Bay Area Governments

Joint MTC Legislation Committee and ABAG Legislation Committee

November 8, 2019 **Agenda Item 4b**

2020 Draft Joint Advocacy Program

Subject: Draft of the joint MTC/ABAG 2020 Advocacy Program.

Overview: Attached is the first draft of the joint MTC/ABAG Advocacy Program for 2020. We have updated the format this year to provide high level goals in order to provide a clearer statement about our agency's policy priorities, including in areas where we may not have a specific proposal in mind, but believe it should be a legislative priority. Such goals can be a helpful to staff as bills are introduced as well as sending a signal to our regional and statewide partners as well as the Bay Area delegation as to our priorities and potential opportunities for partnership.

Staff is in the early phase of this process. As done in prior years, we have convened MTC's Partnership Legislative Committee—comprised of legislative staff from cities, transit agencies and Bay Area county transportation agencies and other interested parties— to hear about their priorities and, later this month, we are hosting an annual meeting with staff from Regional Transportation Planning Agencies across the state to share this draft program and hear about what other organizations are prioritizing next year. We plan to present the draft to the Policy Advisory Council and the ABAG Regional Planning Committee at their meetings in November and January. Based on discussion at your meeting and additional feedback received, staff will prepare a final 2020 Advocacy Program for your consideration at another joint ABAG/MTC Legislation Committee meeting in January, prior to final approval by the Commission and Executive Board. We look forward to hearing your feedback.

Attachments: Attachment A: 2020 Draft Advocacy Program

Therese W. McMillan

METROPOLITAN TRANSPORTATION COMMISSION

2020 DRAFT ADVOCACY PROGRAM

Association of Bay Area Governments

State Advocacy Goals and Proposals	
1. **Housing:** Improve access to opportunity by supporting policies aimed at increasing production of housing and increasing funding to produce and preserve affordable housing and associated infrastructure to help build complete communities.	
A. Increase funding available for affordable housing and other supportive infrastructure	Monitor and support efforts to provide additional state resources for housing and other infrastructure to ensure housing investments can be made in conjunction with improvements to parks/open space, and other resources to improve Bay Area resident's quality of life. Efforts will include advocacy in support of a restoration of tax-increment financing or similar local option for affordable housing and supportive infrastructure, such as AB 11 (Chiu), a two-year bill, or a reconfiguration of SB 5 (Beall), which was vetoed in 2019 by Governor Newsom.
B. Support upzoning near public transit and jobs-rich areas	Monitor and engage with key stakeholders on SB 50 (Wiener), a two-year bill that seeks to reduce barriers to higher-density housing development in transit- and jobs-rich areas. Continue to advocate for the MTC and ABAG Joint Legislation Committee's recommendations from May 2019, which sought to provide greater flexibility on implementation at the local level, while still requiring minimum levels residential density to be allowed in transit-rich and jobs-rich areas.
C. Lower barriers to new housing or transportation tax measures	Support ACA 1 (Aguiar-Curry)—which would lower the vote threshold for affordable housing and infrastructure bonds to 55 percent.

2. **Transportation Funding:** Support implementation of Plan Bay Area 2050 by protecting and increasing funding for all modes of transportation.	
Regional transportation revenue ballot measure	Collaborate with key stakeholders seeking authorization to place on the ballot a Bay Area transportation revenue measure. Ensure that any measure is aligned with *Plan Bay Area* and includes reforms to support the efficient management and seamless operation of our transportation system. Support a robust public engagement process so that all Bay Area needs are considered when crafting the package of projects, programs and policies. Assuming placement of a regional transportation measure on the ballot in 2020, staff will work to develop public information materials and support partners in their efforts to inform the public about the proposed initiative.
Zero emission bus mandate	Support expanding and/or broadening eligibility of existing state funds to help transit operators convert their bus fleets to zero-emission in order to meet the state's Innovative Clean Transit rule.
Equitable access to transportation	Support broadening eligibility requirements in existing and/or new transportation funding streams to enable their use as a subsidy for low-income transportation system users (e.g. discounted fares for public transportation or shared mobility services).
3. **Public Transit:** Support policies aimed at ensuring public transit is an affordable, reliable and convenient transportation option.	
Transportation Development Act (TDA) performance standards update	Partner with the California Transit Association in its efforts to update California's current TDA (Transportation Development Act) eligibility requirements in an era of emergent on-demand transportation options that are contributing to declining transit ridership nationwide. Explore development of alternative performance measures that are focused on incentivizing transit agency actions that improve transit service and increase ridership, consistent with state and regional climate and equity goals.

4. **Project Delivery:** Support strategies to speed up the delivery of transportation projects.	
Flexibility in Contracting & Public Private Partnerships	Support efforts to expedite transportation project delivery by increasing contracting and financing options, including increased flexibility in the Caltrans design review process and broad authority for the use of design-build and public-private partnerships by Caltrans and regional transportation agencies.
5. **Congestion Relief:** Support policies aimed at reducing vehicle miles traveled and associated traffic congestion, including, but not limited to, pricing strategies and employer-based programs to help reduce the share of commuting by single-occupant vehicles. Keep equity impacts in mind when evaluating any such pricing strategies.	
6. **System Effectiveness:** Advocate for policies that improve the Bay Area's transportation system's effectiveness and service delivery, including improved enforcement, minimization of fraud and litigation, and protection of user's privacy. Ensure agencies can communicate with their customers to provide relevant transportation-related information and quality service while following industry best practices with regard to enabling customers to opt-in to receive non-essential communications.	
A. Improve toll collection & enforcement	Support enactment of SB 664 (Allen), related to affirming toll agencies' ability to share information about toll transactions necessary for the seamless collection of tolls and toll penalties. The bill would retain current privacy protections for customers, clarify current law with respect to handling of personally identifiable information by toll agencies and their subcontractors, and more clearly define toll agencies obligations with respect to delivery of toll violation notices. Engage the Bay Area delegation and staff on the importance of tolls to our current and future transportation system and ensure that they are well informed about how we administer toll violations and disputes, as well as our privacy policies with respect to protecting personally identifiable information.
B. Reduce credit card fraud at clipper vending machines	In partnership with the California Transit Association and Bay Area transit operators, support legislation to prevent fraud-related fare revenue losses by authorizing credit card ZIP code authentication at unattended public transit ticket machines, similar to authorization granted to gas stations.
C. Improve HOV and Express Lanes Performance	Support efforts to improve the performance of high-occupancy vehicle (HOV) and express lanes through enhanced enforcement of vehicle passenger occupancy requirements.

7. **New Mobility:** Engage in regulatory and legislative efforts to facilitate the deployment of new mobility technologies with the goal of accelerating their safety, accessibility, mobility, environmental, equity and economic benefits, including opportunities to support improved transit access. Advocate for increased access to critical travel pattern data by local, regional and state agencies for transportation and land use planning and operational purposes while ensuring privacy is protected.	
8. **Climate Change & Resilience:** Support funding and policy strategies to help achieve and better coordinate state and regional climate goals and improve the Bay Area's resilience to natural hazards and the impacts of climate change, including earthquakes, sea level rise and fire.	
A. SB 375 implementation and reform	Monitor legislation aimed at updating SB 375 (Steinberg, 2008) in light of the California Air Resources Board's *2018 Progress Report* on the bill, which concluded that the legislation is falling short of expectations with respect to greenhouse gas reductions from changes in land use and travel behavior. Support legislation to increase the availability of funding at the regional level to help implement sustainable communities strategies, as well as policy tools to reduce single-occupancy vehicle travel in a manner than ensures equitable policy outcomes.
B. State Route 37 improvements	Sponsor legislation in collaboration with Caltrans and the four north bay counties of Marin, Napa, Solano and Sonoma to authorize tolls on State Route 37—adding it as the 8th bridge in the state-owned toll bridge system administered as part of the Bay Area Toll Authority enterprise—to help fund the long-term reconstruction and resilience of the SR 37 roadway. Ensure legislation contains appropriate triggers related to a long-term solution in the corridor before tolls are imposed.
C. Increase the Bay Area's preparedness for a major earthquake	Continue to support legislation aimed at increasing funding for residential seismic retrofits, such as SB 254 (Hertzberg), a two-year bill supported by ABAG in 2019. Also support proposals to help local agencies develop an inventory of seismically vulnerable buildings, such as AB 429 (Nazarian, 2019), which ABAG also supported but which stalled on the Senate Floor.

9. **Safety:** Improve roadway safety for all users	
Vision Zero	Monitor and support legislation aimed at achieving the Vision Zero goals of no roadway-related deaths or serious injuries by improving safety for all road users, including non-motorists.

Federal Advocacy Goals and Proposals	
1. **Reauthorization:** Engage in national deliberations prioritizing the funding and policy framework for the next surface transportation bill	
	Work with partners across the country to support a long-term, fully funded transportation authorization that supports states and regions in achieving national goals related to infrastructure condition, safety, mobility, and air quality; provides new resources to make the nation's transportation networks responsive to transformative technologies and the changing climate; and empowers the Bay Area to address our region's unique mobility challenges. MTC's federal transportation advocacy efforts will center around building on the progress made in the Fixing America's Surface Transportation (FAST) Act, as follows: 1. **Raise New Revenues & Grow Existing Programs:** Raise revenues to restore Highway Trust Fund solvency and increase federal transportation investment. Grow core FAST Act-authorized surface transportation programs, which have proven effective in delivering essential funds to California and the Bay Area. 2. **FAST Act Updates:** Within the FAST Act framework, grow federal support for transit and regional mobility solutions, update transit programs to reward Bay Area best practices, and expedite project delivery without harming the environment. 3. **21st Century Challenges and Opportunities:** Establish the federal government as a strong partner in state and regional efforts to make transportation networks responsive to transformative technologies and the changing climate. The next transportation bill should include significant new resources for metropolitan areas to invest in solutions to the myriad mobility and related challenges facing the Bay Area and metros nationwide.

2. **Appropriations:** Support robust transportation and housing appropriations	
A. Programmatic appropriations	Partner with local, regional and statewide transportation agencies as well as national stakeholders to ensure that Congress funds highway, transit and rail programs at no less than FAST Act-authorized levels. If Congress proposes to increase appropriations above FAST Act-authorized levels, seek to maximize Bay Area funding in revenue allocations. Additionally, work to defend federal affordable housing funds and programs, such as Section 8 housing vouchers, the HOME Investment Partnership Program and the Community Development Block Grant Program.
B. Advocate for discretionary grant awards, including Capital Investment Grant funding for Resolution 3434/ *Plan Bay Area* Projects	Work with regional, state and national partners to advocate for implementation of the Capital Investment Grant (CIG) Program as authorized by the FAST Act. Support federal appropriations consistent with the full funding grant agreements approved for the Caltrain Peninsula Corridor Electrification project. Seek to advance through the CIG process the Bay Area's next generation of transit expansion projects, namely: San Francisco Transbay Transit Center (Phase 2)/Downtown Extension (DTX), BART to Silicon Valley: Phase 2, and the Transbay Corridor Core Capacity project. Support additional Bay Area transportation agency and transit operator efforts to secure discretionary funding for projects consistent with *Plan Bay Area.*
3. **Transportation Innovation:** Support policies that enable technological innovations to improve mobility, while protecting the public's interest	
	In partnership with Bay Area cities and counties, the business community, and state and national transportation organizations, engage in regulatory and legislative efforts related to facilitating the deployment of transformative transportation technologies with the goal of accelerating safety, mobility, environmental, equity and economic benefits associated with new mobility technologies, including application in the transit sector. With respect to connected vehicles and autonomous vehicles (CV/AV), support strong federal vehicle safety standards while also preserving the ability of state and local agencies to continue to set policies governing the operation of vehicles on highways and local roads, regardless of whether they are driven autonomously or manually.
4. **Air Quality/Climate Protection:** Defend against rollbacks of California's air quality and climate change laws and regulations, such as fuel efficiency standards and Cap and Trade programs.	

5. **Access to Health Care:** Support efforts to increase federal funding and eligibility from non-transportation sources to improve access to health care services.

375 Beale Street, Suite 800
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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1194	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results (30 minutes) Presentation on the draft results from the Project Performance Assessment, which evaluated approximately 100 projects against the three Futures to determine their cost-effectiveness, equity impacts, and alignment with Guiding Principles.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	06_Horizon_PBA2050-Draft Project Performance Assessment Results.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results
(30 minutes)

Presentation on the draft results from the Project Performance Assessment, which evaluated approximately 100 projects against the three Futures to determine their cost-effectiveness, equity impacts, and alignment with Guiding Principles.

Presenter:
Anup Tapase

Recommended Action:
Information

Attachments:

Metropolitan Transportation Commission
Policy Advisory Council

November 13, 2019 **Agenda Item 6**

Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results

Subject: Presentation on the draft results from the Project Performance Assessment, which evaluated 93 projects against the three Futures to determine their cost-effectiveness, equity impacts, and alignment with Guiding Principles.

Background: Policy Advisory Council Agenda Item 6, Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results is attached. This report will be presented to the Joint MTC Planning Committee with the ABAG Administrative Committee on November 8, 2019.

Staff will be at your November 13 meeting to discuss this report. The Council's input is requested.

Attachments: Agenda Item 5a from the November 8, 2019 Joint MTC Planning Committee with the ABAG Administrative Committee

Metropolitan Transportation Commission and the Association of Bay Area Governments
Joint MTC Planning Committee with the ABAG Administrative Committee

November 8, 2019 **Agenda Item 5a**

Horizon / Plan Bay Area 2050: Draft Project Performance Assessment Results

Subject: Presentation on the draft results from the Project Performance Assessment, which evaluated 93 projects against the three Futures to determine their cost-effectiveness, equity impacts, and alignment with Guiding Principles.

Background: The Project Performance Assessment has historically provided a key lens to understand the benefits and limitations of major infrastructure projects as we develop the regional plan; this cycle has incorporated substantive improvements to better capture resilience and equity in the assessment framework. The Horizon/Plan Bay Area 2050 Project Performance Assessment evaluates three primary types of transportation projects: capacity-increasing investments, operational strategies, and resilience projects to address sea level rise and seismic hazards. Committed projects—those that have full funding plans and environmental clearance—are exempt from project performance and were included in the analysis baseline. Uncommitted projects subject to assessment—generally capacity-increasing investments with total costs greater than $250 million—were all evaluated using a consistent evaluation methodology.

Methodology

Developed between summer 2018 and winter 2019 with input from working groups and committees, the methodology builds upon Plan Bay Area (2013) and Plan Bay Area 2040 (2017). All projects were evaluated consistently using three assessment types, identified below, with the results summarized in **Attachment A**.

1. **Benefit-Cost Assessments** (quantitative using Travel Model 1.5)
   Compares societal benefits against anticipated project costs under three different Futures.
2. **Equity Assessments** (quantitative using Travel Model 1.5)
   Examines distributive impacts of project-level accessibility benefits across income groups under three different Futures.
3. **Guiding Principles Assessment** (qualitative)
   Evaluates alignment with Horizon's five Guiding Principles using specific project-focused criteria, flagging areas of potential concern.

While the Project Performance Assessment is more robust than prior cycles, it should be noted that all models and analyses have limitations. This analysis reflects our best effort to provide a data-driven lens on how projects perform, but it is not the only consideration when crafting the fiscally-constrained Plan.

Initial Findings

Highlights from the analysis findings to-date are included in **Attachment F.** The draft Project Performance Assessment results include 77 of the 93 projects analyzed. Remaining projects will be analyzed in November and integrated into the final findings, slated for release at the end of the year.

Next Steps

Results for Transformative Projects submitted by the public, as well as any other projects that require additional evaluation, will be released after November. Project Performance will remain in draft form through the end of 2019 as we work towards next steps and integration with the Plan Bay Area 2050 Blueprint, which will include identification of high-performing projects and collaboration sessions with other project sponsors.

Issues: MTC is in the midst of developing Plan Bay Area 2050, the Bay Area's long-range fiscally-constrained plan for transportation, housing, the economy, and the environment. It is not feasible to include all of the proposed transportation investments using the region's forecasted revenues, even if new revenues become available. Fiscal constraint necessitates prioritization of investment priorities, which will be informed by MTC's ongoing Project Performance Assessment, as well as parallel work on strategies via the recently-completed Futures Planning effort.

Recommendation: In prior cycles of Plan Bay Area, MTC has used the Project Performance Assessment to identify outliers - both positive and negative - in order to inform the development of the regional plan's transportation investment strategy. Criteria were established to group projects into a status of low-, medium-, or high-performing. Project sponsors of low-performing projects were required to present a "compelling case" to the Commission in order to include their respective project into the fiscally-constrained regional plan, whereas high-performing projects were prioritized for their inclusion.

MTC remains committed to using performance data to inform key decisions in the context of the fiscally-constrained Plan Bay Area 2050. However, we are considering a fresh approach to move forward that focuses on finding solutions to projects' performance deficiencies, rather than requiring a "compelling case" for such projects.

For high-performing projects, MTC will work with Plan stakeholders to identify the appropriate criteria to identify the highest-performing projects. This will include cost-effectiveness across multiple Futures, support for social equity goals, and alignment with the Guiding Principles. This process will help showcase the projects that performed the best in the Project Performance Assessment so that these projects are strongly considered for inclusion when crafting the transportation component of the Plan Bay Area 2050 Draft Blueprint. Staff will propose a definition for high-performing projects in December or January for Commission approval.

For the remaining projects, staff is exploring alternative approaches focused on actions to boost a project's relative performance. Depending on the performance results, these solutions may take the form of complementary transportation strategies – like pricing or safety enhancements – as well as land use strategies or equity mitigations. As we begin to consider various project investments in the fiscally-constrained Plan, we would like to engage with each CTA, transit operator, and project sponsor in a collaborative dialogue to identify the appropriate supportive strategies to boost project performance to achieve a resilient, equitable and cost-effective Blueprint for Plan Bay Area 2050.

Attachments:
Attachment A: Overall Summary Table *(Draft)*
Attachment B: Guiding Principles & Equity Summary Table *(Draft)*
Attachment C: Detailed Table of Guiding Principle Flags *(Draft)*
Attachment D: Detailed Table of Lifecycle Benefits by Future *(Draft)*
Attachment E: Detailed Table of Lifecycle Costs *(Draft)*
Attachment F: Presentation

Therese W. McMillan

Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment A: Overall Summary Table
Benefit-Cost Ratios and Equity Scores across Three Futures, and Guiding Principle Flags

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(see notes on methodology at the bottom of the page)

							Benefit-Cost Ratio			Equity Score		
Project Type	Project ID	Row ID	Project	Project Source	Lifecycle Cost	Guiding Principle Flags	Rising Tides Falling Fortunes	Clean and Green	Back to the Future	Rising Tides Falling Fortunes	Clean and Green	Back to the Future
Build Core Rail	1004	1	New San Francisco-Oakland Transbay Rail Crossing - Commuter Rail (Crossing 5)	Crossings Study	$46.1B	2	0.7	2	2	Even	Even	Even
	1007	2	New San Francisco-Oakland Transbay Rail Crossing - BART + Commuter Rail (Crossing 7)	Crossings Study	$83.5B	2	0.6	1	1	Even	Even	Even
	1002	3	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 3: Mission St)	Crossings Study	$36.2B	0	0.6	1	1	Even	Even	Even
	1003	4	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 4: New Markets)	Crossings Study	$37.4B	0	0.6	1	1	Even	Even	Even
	2300	5	Caltrain Downtown Extension	TJPA	$4.8B	0	<0.5	0.7	0.6	Challenges	Challenges	Challenges
	2205	6	BART to Silicon Valley (Phase 2)	VTA	$6.0B	0	<0.5	<0.5	0.6	Advances	Advances	Even
	2310	7	Megaregional Rail Network + Resilience Project (Caltrain, ACE, Valley Link, Dumbarton, Cap Cor)	City of San Jose	$54.1B	2	<0.5	0.5	<0.5	Challenges	Challenges	Challenges
	2306	8	Dumbarton Rail (Redwood City to Union City)	SamTrans + CCAG	$3.9B	0	<0.5	<0.5	0.5	Even	Even	Challenges
	2208	9	BART Gap Closure (Millbrae to Silicon Valley)	VTA	$40.4B	0	<0.5	<0.5	<0.5	Advances	Advances	Even
	6002	10	SMART to Richmond via New Richmond-San Rafael Bridge *	Public/NGO Submission		2	cost estimation and modeling in progress			modeling in progress		
Extend Rail Network - High Cost	2308	11	Valley Link (Dublin to San Joaquin Valley)	TVSJVRRA	$3.0B	0	<0.5	1	1	Even	Even	Even
	2206	12	BART Extension from Diridon to Cupertino	VTA	$12.1B	0	<0.5	<0.5	<0.5	Even	Advances	Even
	2203	13	BART to Hercules & I-80 Bus from Vallejo to Oakland	CCTA	$5.8B	0	<0.5	<0.5	<0.5	Challenges	Challenges	Challenges
	2207	14	BART Extension from Diridon to Gilroy (replacing existing Caltrain)	VTA	$17.7B	1	<0.5	<0.5	<0.5	Even	Advances	Even
	2204	15	BART on I-680 (Walnut Creek to West Dublin/Pleasanton)	Caltrans	$11.0B	0	<0.5	<0.5	<0.5	Even	Even	Even
	2307	16	ACE Service Expansion and Capital Improvements (to San Joaquin Valley)	ACE Rail		0	modeling in progress			modeling in progress		
	2309	17	Altamont Vision Phase 1 (to San Joaquin Valley)	ACE Rail		0	modeling in progress			modeling in progress		
Extend Rail Network - Low Cost	2305	18	SMART to Solano (Novato to Suisun City, without sea level rise protections) ^	SMART	$1.6B	0	<0.5	<0.5	<0.5	Even	Challenges	Challenges
	2202	19	BART DMU Extension to Brentwood	CCTA	$0.6B	0	<0.5	0.5	<0.5	Advances	Challenges	Challenges
	2304	20	SMART Extension to Cloverdale ^	SMART	$0.5B	0	<0.5	<0.5	<0.5	Challenges	Even	Challenges
Optimize Existing Transit Network - High Cost	2201	21	BART Core Capacity	BART	$4.5B	0	1	2	2	Even	Even	Even
	2303	22	Caltrain Full Electrification and Blended System: High Growth	VTA, City of San Jose	$36.9B	2	<0.5	1	0.5	Challenges	Even	Challenges
	2302	23	Caltrain Full Electrification and Blended System: Moderate Growth	Caltrain + HSR	$24.6B	2	<0.5	0.9	0.5	Challenges	Even	Challenges
	2001	24	AC Transit Local Rapid Network: Capital Improvements + Service Increase	AC Transit	$8.4B	0	<0.5	0.5	0.6	Advances	Advances	Even
	2005	25	Alameda County BRT Network + Connected Vehicle Corridors	ACTC	$4.0B	0	<0.5	<0.5	0.6	Advances	Advances	Even
	2410	26	VTA LRT Systemwide Grade Separation and Full Automation	City of San Jose	$14.8B	1	<0.5	<0.5	0.7	Advances	Advances	Even
	2407	27	Muni Metro Southwest M-Line Subway	SFCTA	$5.6B	0	<0.5	<0.5	<0.5	Advances	Advances	Challenges
	2409	28	VTA LRT Systemwide Grade Separation	VTA	$11.6B	0	<0.5	<0.5	0.5	Advances	Advances	Even
	2411	29	VTA LRT Systemwide Grade Separation, Network Expansion, and Full Automation	City of San Jose and VTA	$44.2B	0	<0.5	<0.5	<0.5	Advances	Advances	Even
	2301	30	Caltrain Full Electrification and Blended System: Base Growth	Caltrain + HSR	$20.9B	2	<0.5	<0.5	<0.5	Even	Even	Even
	2401	31	North San Jose LRT Subway	VTA	$4.9B	0	<0.5	<0.5	0.5	Even	Advances	Even

Lifecycle Costs: This includes initial capital cost, annual O&M costs, rehabilitation and replacements costs, and a residual value of the investment at the end of the analysis period, calculated using discounted present value methodology. Refer to Attachment D for details, and for costs as reviewed with sponsors.
Guiding Principle Flags: Flags, based on qualitative analysis, are intended to draw attention to a direct adverse impact a project may have that may not be captured as part of other assessments. Refer to Attachment C for details.
Benefit-Cost Ratio: All project impacts are measured against a uniform base transportation and land use network in each future, except Resilience projects, which are measured against a baseline where that asset is out of service (hence n/a in some futures). Costs and Benefits to determine the ratio are detailed in Attachment D and E.
For inter-regional projects, since we are only able to model Bay Area benefits, we multiplied the benefits by a factor to reflect the ratio of expected ridership from outside the region. Valley Link benefit multiplier: 3.3; Caltrain/HSR benefit multiplier: 1.3 (the HSR multiplier is applied in Clean and Green only, the future where HSR is completely built out).
Equity Score:
"Advances" indicates that the project may benefit lower income individuals (below regional median income) more than higher income individuals.
"Challenges" indicates that project benefits skew towards higher income individuals.
"Even" indicates even distribution of benefits for all income groups.
Note on Bicycle Projects: We are not able to sufficiently model improvements to individual bicycle facilities using Travel Model 1.5 (except Bay Bridge West Span since this opens up a connection); Travel Model 2.0 (under development) may allow more advanced analysis in the future. As an interim solution, we modelled a single "Enhanced Regionwide Bike Infrastructure" (Project ID 6006), supported by off-model assertions based on research literature review. This project does not consider any specific improvements, but instead provides perspective on the benefits of a regionwide bike infrastructure investment (e.g. shared streets, trails, superhighways) on our transportation system.

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							Benefit-Cost Ratio			Equity Score		
Project Type	Project ID	Row ID	Project	Project Source	Lifecycle Cost	Guiding Principle Flags	Rising Tides Falling Fortunes	Clean and Green	Back to the Future	Rising Tides Falling Fortunes	Clean and Green	Back to the Future
Optimize Existing Transit Network - Low Cost	3001	32	Treasure Island Tolling and Mobility Program (Muni and AC Transit, Free Island Shuttles, Ferry)	SF	$0.8B	1	8	7	>10	Challenges	Challenges	Challenges
	2209	33	Irvington BART Infill Station *	ACTC	$0.2B	0	1	1	9	Even	Even	Even
	3002	34	Downtown San Francisco Congestion Pricing	SF	$0.3B	1	2	3	4	Challenges	Challenges	Challenges
	2007	35	San Francisco Southeast Waterfront Transit Improvements *	SF	$0.6B	0	2	3	4	Even	Even	Even
	2100	36	San Pablo BRT	AC Transit	$0.5B	0	1	3	4	Advances	Advances	Even
	2008	37	Alameda Point Transit Network Improvements *	ACTC	$0.5B	0	0.7	3	4	Even	Even	Even
	2000	38	AC Transit Local Network: Service Increase	AC Transit	$2.6B	0	1	2	2	Advances	Advances	Even
	2101	39	Geary BRT (Phase 2)	SF	$0.6B	0	1	2	3	Even	Even	Challenges
	2105	40	Alameda County E14th St/Mission and Fremont Blvd Multimodal Corridor *	ACTC	$0.5B	0	1	2	2	Advances	Advances	Even
	2103	41	SamTrans El Camino Real BRT: Capital and Service Improvements *	CCAG	$0.4B	0	0.7	2	1	Advances	Even	Challenges
	2003	42	Muni Forward: Capital Improvements + Service Increase	SF	$2.9B	0	0.7	2	1	Even	Even	Even
	2004	43	Sonoma Countywide Bus: Service Increase ^	SCTA	$0.9B	0	<0.5	<0.5	1	Advances	Even	Even
	2400	44	Downtown San Jose LRT Subway	VTA	$1.9B	0	<0.5	<0.5	1	Even	Even	Even
	6100	45	Integrated Transit Fare System *	Public/NGO Submission		0	cost estimation and modeling in progress			modeling in progress		
	6101	46	Free Transit *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
Build Local Transit	4000	47	Oakland/Alameda Gondola Network	City of Oakland	$1.1B	1	0.7	<0.5	2	Even	Advances	Even
	2403	48	Vasona LRT Extension (Phase 2)	VTA	$0.3B	0	0.7	<0.5	1	Advances	Advances	Even
	4001	49	Mountain View AV Network (Free Fare, Subsidies from Companies)	City of Mountain View	$1.4B	1	<0.5	0.9	1	Advances	Advances	Advances
	2412	50	SR-85 LRT (Mountain View to US101 interchange)	City of Cupertino	$3.7B	0	<0.5	0.7	0.6	Even	Challenges	Even
	5003	51	I-680 Corridor Improvements (BRT, Express Bus, Shared AVs, Gondolas)	CCTA	$4.6B	0	<0.5	0.5	0.6	Even	Even	Even
	2408	52	Muni Metro T-Third Extension to South San Francisco	City of South San Francisco	$1.8B	0	<0.5	<0.5	1	Challenges	Challenges	Even
	4002	53	Contra Costa Autonomous Shuttle Program	CCTA	$3.4B	0	<0.5	<0.5	<0.5	Advances	Even	Challenges
	4003	54	Cupertino-Mountain View-San Jose Elevated Maglev Rail Loop	City of Cupertino	$8.1B	1	<0.5	<0.5	<0.5	Challenges	Challenges	Challenges
	2402	55	San Jose Airport People Mover	VTA	$1.4B	0	<0.5	<0.5	<0.5	Even	Challenges	Even
Enhance Alternate Modes	2600	56	WETA Ferry Service Frequency Increase	WETA	$0.4B	0	2	6	3	Challenges	Even	Even
	6006	57	Enhanced Regionwide Bike Infrastructure	MTC/ABAG	$12.6B	0	1	3	3	Advances	Advances	Advances
	2601	58	WETA Ferry Network Expansion (Berkeley, Alameda Pt, Redwood City, Mission Bay, Treasure Islan..	WETA	$1.0B	0	1	2	2	Even	Even	Even
	2700	59	Bay Bridge West Span Bike Path	MTC/ABAG	$0.8B	0	<0.5	1	0.5	Even	Challenges	Challenges
	4004	60	Regional Hovercraft Network *	CCAG		0	modeling in progress			modeling in progress		
	6004	61	Bay Trail Completion	Public/NGO Submission		0	cannot be modeled			cannot be modeled		
	6005	62	Regional Bicycle Superhighway Network	Public/NGO Submission		0	cannot be modeled			cannot be modeled		

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Build Road Capacity - High Cost	1001	63	Southern Crossing Bridge + New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 6)	Crossings Study	$47.1B	1	0.6	1	2	Even	Even	Even
	3000	64	Regional Express Lanes (MTC + VTA + ACTC + US-101)	MTC/ABAG	$12.1B	1	0.6	in progress	2	Challenges	in progress	Challenges
	1005	65	Mid-Bay Bridge (I-238 to I-380) (Crossing 2)	Crossings Study	$19.9B	2	<0.5	<0.5	1	Even	Challenges	Even
	1006	66	San Mateo Bridge Reconstruction and Widening (Crossing 1)	Crossings Study	$15.7B	1	<0.5	<0.5	<0.5	Advances	Challenges	Even
Build Road Capacity - Low Cost	3103	67	SR-4 Widening (Brentwood to Discovery Bay)	CCTA	$0.4B	1	<0.5	<0.5	6	Advances	Even	Challenges
	3101	68	I-680/SR-4 Interchange Improvements (Direct/HOV Connectors, Ramp Widening, Auxiliary Lanes)	CCTA	$0.4B	1	<0.5	2	3	Even	Challenges	Even
	3110	69	Union City-Fremont East-West Connector *	ACTC	$0.4B	1	0.7	1	3	Even	Even	Even
	3102	70	SR-4 Operational Improvements	CCTA	$0.5B	1	<0.5	1	2	Challenges	Challenges	Even
	3104	71	I-80/I-680/SR-12 Interchange + Widening (Phases 2B-7)	STA	$0.7B	2	<0.5	1	1	Challenges	Even	Even
	3106	72	SR-152 Realignment and Tolling	VTA	$1.9B	2	2	<0.5	<0.5	Even	Challenges	Even
	3109	73	SR-262 Widening and Interchange Improvements *	ACTC	$1.0B	2	<0.5	<0.5	1	Even	Even	Challenges
	3100	74	SR-239 Widening (Brentwood to Tracy including airport connector)	CCTA	$2.4B	1	<0.5	<0.5	0.9	Challenges	Advances	Challenges
	3105	75	SR-12 Widening (I-80 to Rio Vista)	STA	$2.5B	2	<0.5	<0.5	0.7	Even	Challenges	Even
Optimize Existing Freeway Network	5000	76	Bay Area Forward (Phase 1: Freeway Ramp and Arterial Components Only)	MTC/ABAG	$0.6B	1	7	in progress	6	Challenges	in progress	Challenges
	3003	77	San Francisco Arterial HOV and Freeway HOT Lanes	SF	$1.3B	0	0.5	0.9	3	Challenges	Challenges	Even
	2002	78	AC Transit Transbay Network: Capital Improvements + Service Increase	AC Transit	$6.5B	0	0.5	0.8	1	Challenges	Challenges	Challenges
	6001	79	Bus Rapid Transit (BRT) on All Bridges *	Public/NGO Submission		0	cost estimation and modeling in progress			modeling in progress		
	6003	80	I-80 Corridor Overhaul *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
	6020	81	Regional Express Bus Network + Optimized Express Lane Network *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
	6102	82	Higher-Occupancy HOV Lanes with VMT Fee for SOV *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
	6103	83	Demand-Based Tolls on All Highways *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
	6104	84	Reversible Lanes on Congested Bridges and Freeways *	Public/NGO Submission		1	cost estimation and modeling in progress			modeling in progress		
	6105	85	Freight Delivery Timing Regulation	Public/NGO Submission		1	cannot be modeled			cannot be modeled		
Resilience	7006	86	I-880 Resilience Project (South Fremont)	MTC/ABAG/BCDC	$0.1B	0	>10	n/a	n/a	Challenges	n/a	n/a
	7002	87	I-580/US-101/SMART Marin Resilience Project	MTC/ABAG/BCDC	$0.2B	0	>10	>10	>10	Challenges	Challenges	Challenges
	7004	88	SR-84 Resilience Project (Dumbarton Bridge, 101 interchange)	MTC/ABAG/BCDC	$0.2B	0	>10	n/a	n/a	Challenges	n/a	n/a
	7003	89	US-101 Peninsula Resilience Project (San Antonio Rd, Poplar Ave, Millbrae Ave)	MTC/ABAG/BCDC	$0.2B	0	>10	n/a	n/a	Challenges	n/a	n/a
	7005	90	SR-237 Resilience Project (Alviso)	MTC/ABAG/BCDC	$0.2B	0	>10	n/a	>10	Even	n/a	Even
	7001	91	VTA LRT Resilience Project (Tasman West)	MTC/ABAG/BCDC	$0.2B	0	5	5	8	Even	Advances	Even
	3200	92	SR-37 Long Term Project (Tolling, Elevation, Interchanges, Widening, Express Bus)	MTC/ABAG/North Bay Cou..	$5.4B	2	0.7	0.5	<0.5	Challenges	Challenges	Challenges
	7000	93	BART Caldecott Tunnel Resilience Project	BART		0	modeling in progress			modeling in progress		

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Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment B: Guiding Principles and Equity Summary Table

Note 1: Total number of rows: 93; 81 projects from public agencies, 12 projects from public/NGOs that were jury finalists from the Transformative Projects process
Note 2: Findings are not shown for 4 public agency projects and the 12 jury finalists, since modelling and/or cost review are in progress
Note 3: Projects are ordered by their potential to advance equity based on the equity score
(see high-level description of methodology at the bottom of the page)

Project ID	Row ID	Project	Project Type	Lifecycle Cost	Guiding Principle Flags	Provides Point of Access in CoC?	Equity Score		
							Rising Tides Falling Fortunes	Clean and Green	Back to the Future
4001	1	Mountain View AV Network (Free Fare, Subsidies from Companies)	Build Local Transit	$1.4B	1	No	Advances	Advances	Advances
6006	2	Enhanced Regionwide Bike Infrastructure	Enhance Alternate Modes	$12.6B	0	Yes	Advances	Advances	Advances
2100	3	San Pablo BRT	Optimize Existing Transit Network - Low Cost	$0.5B	0	Yes	Advances	Advances	Even
2001	4	AC Transit Local Rapid Network: Capital Improvements + Service Increase	Optimize Existing Transit Network - High Cost	$8.4B	0	Yes	Advances	Advances	Even
2000	5	AC Transit Local Network: Service Increase	Optimize Existing Transit Network - Low Cost	$2.6B	0	Yes	Advances	Advances	Even
2409	6	VTA LRT Systemwide Grade Separation	Optimize Existing Transit Network - High Cost	$11.6B	0	Yes	Advances	Advances	Even
2005	7	Alameda County BRT Network + Connected Vehicle Corridors	Optimize Existing Transit Network - High Cost	$4.0B	0	Yes	Advances	Advances	Even
2208	8	BART Gap Closure (Millbrae to Silicon Valley)	Build Core Rail	$40.4B	0	Yes	Advances	Advances	Even
2403	9	Vasona LRT Extension (Phase 2)	Build Local Transit	$0.3B	0	Yes	Advances	Advances	Even
2410	10	VTA LRT Systemwide Grade Separation and Full Automation	Optimize Existing Transit Network - High Cost	$14.8B	1	Yes	Advances	Advances	Even
2205	11	BART to Silicon Valley (Phase 2)	Build Core Rail	$6.0B	0	Yes	Advances	Advances	Even
2411	12	VTA LRT Systemwide Grade Separation, Network Expansion, and Full Automation	Optimize Existing Transit Network - High Cost	$44.2B	0	Yes	Advances	Advances	Even
2105	13	Alameda County E14th St/Mission and Fremont Blvd Multimodal Corridor	Optimize Existing Transit Network - Low Cost	$0.5B	0	Yes	Advances	Advances	Even
2004	14	Sonoma Countywide Bus: Service Increase	Optimize Existing Transit Network - Low Cost	$0.9B	0	Yes	Advances	Even	Even
4000	15	Oakland/Alameda Gondola Network	Build Local Transit	$1.1B	1	Yes	Even	Advances	Even
2206	16	BART Extension from Diridon to Cupertino	Extend Rail Network - High Cost	$12.1B	0	No	Even	Advances	Even
2401	17	North San Jose LRT Subway	Optimize Existing Transit Network - High Cost	$4.9B	0	Yes	Even	Advances	Even
7001	18	VTA LRT Resilience Project (Tasman West)	Resilience	$0.2B	0	No	Even	Advances	Even
2207	19	BART Extension from Diridon to Gilroy (replacing existing Caltrain)	Extend Rail Network - High Cost	$17.7B	1	Yes	Even	Advances	Even
2407	20	Muni Metro Southwest M-Line Subway	Optimize Existing Transit Network - High Cost	$5.6B	0	No	Advances	Advances	Challenges
2400	21	Downtown San Jose LRT Subway	Optimize Existing Transit Network - Low Cost	$1.9B	0	Yes	Even	Even	Even
2204	22	BART on I-680 (Walnut Creek to West Dublin/Pleasanton)	Extend Rail Network - High Cost	$11.0B	0	No	Even	Even	Even
1003	23	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 4: New Markets)	Build Core Rail	$37.4B	0	Yes	Even	Even	Even
2209	24	Irvington BART Infill Station	Optimize Existing Transit Network - Low Cost	$0.2B	0	No	Even	Even	Even
1002	25	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 3: Mission St)	Build Core Rail	$36.2B	0	Yes	Even	Even	Even
2007	26	San Francisco Southeast Waterfront Transit Improvements	Optimize Existing Transit Network - Low Cost	$0.6B	0	Yes	Even	Even	Even
2003	27	Muni Forward: Capital Improvements + Service Increase	Optimize Existing Transit Network - Low Cost	$2.9B	0	Yes	Even	Even	Even
1004	28	New San Francisco-Oakland Transbay Rail Crossing - Commuter Rail (Crossing 5)	Build Core Rail	$46.1B	2	Yes	Even	Even	Even
1007	29	New San Francisco-Oakland Transbay Rail Crossing - BART + Commuter Rail (Crossing 7)	Build Core Rail	$83.5B	2	Yes	Even	Even	Even
2301	30	Caltrain Full Electrification and Blended System: Base Growth	Optimize Existing Transit Network - High Cost	$20.9B	2	Yes	Even	Even	Even
1001	31	Southern Crossing Bridge + New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 6)	Build Road Capacity - High Cost	$47.1B	1	Yes	Even	Even	Even

Equity Score
"Advances" indicates that the project may benefit lower income individuals (below regional median income) more than higher income individuals.
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Provides Point of Access in CoC (Plan Bay Area 2040/legacy equity methodology)
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Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment B: Guiding Principles and Equity Summary Table

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(see high-level description of methodology at the bottom of the page)

Project ID	Row ID	Project	Project Type	Lifecycle Cost	Guiding Principle Flags	Provides Point of Access in CoC?	Equity Score		
							Rising Tides Falling Fortunes	Clean and Green	Back to the Future
2308	32	Valley Link (Dublin to San Joaquin Valley)	Extend Rail Network - High Cost	$3.0B	0	Yes*	Even	Even	Even
2008	33	Alameda Point Transit Network Improvements	Optimize Existing Transit Network - Low Cost	$0.5B	0	Yes	Even	Even	Even
2201	34	BART Core Capacity	Optimize Existing Transit Network - High Cost	$4.5B	0	Yes	Even	Even	Even
3110	35	Union City-Fremont East-West Connector	Build Road Capacity - Low Cost	$0.4B	1	No	Even	Even	Even
2601	36	WETA Ferry Network Expansion (Berkeley, Alameda Pt, Redwood City, Mission Bay, Treasure Islan..	Enhance Alternate Modes	$1.0B	0	Yes	Even	Even	Even
5003	37	I-680 Corridor Improvements (BRT, Express Bus, Shared AVs, Gondolas)	Build Local Transit	$4.6B	0	Yes	Even	Even	Even
7005	38	SR-237 Resilience Project (Alviso)	Resilience	$0.2B	0	No	Even	n/a	Even
4002	39	Contra Costa Autonomous Shuttle Program	Build Local Transit	$3.4B	0	Yes	Advances	Even	Challenges
3103	40	SR-4 Widening (Brentwood to Discovery Bay)	Build Road Capacity - Low Cost	$0.4B	1	Yes	Advances	Even	Challenges
2103	41	SamTrans El Camino Real BRT: Capital and Service Improvements	Optimize Existing Transit Network - Low Cost	$0.4B	0	Yes	Advances	Even	Challenges
1006	42	San Mateo Bridge Reconstruction and Widening (Crossing 1)	Build Road Capacity - High Cost	$15.7B	1	Yes	Advances	Challenges	Even
2101	43	Geary BRT (Phase 2)	Optimize Existing Transit Network - Low Cost	$0.6B	0	Yes	Even	Even	Challenges
2306	44	Dumbarton Rail (Redwood City to Union City)	Build Core Rail	$3.9B	0	Yes	Even	Even	Challenges
3109	45	SR-262 Widening and Interchange Improvements	Build Road Capacity - Low Cost	$1.0B	2	No	Even	Even	Challenges
2402	46	San Jose Airport People Mover	Build Local Transit	$1.4B	0	Yes	Even	Challenges	Even
3106	47	SR-152 Realignment and Tolling	Build Road Capacity - Low Cost	$1.9B	2	No	Even	Challenges	Even
3101	48	I-680/SR-4 Interchange Improvements (Direct/HOV Connectors, Ramp Widening, Auxiliary Lanes)	Build Road Capacity - Low Cost	$0.4B	1	No	Even	Challenges	Even
2412	49	SR-85 LRT (Mountain View to US101 interchange)	Build Local Transit	$3.7B	0	No	Even	Challenges	Even
1005	50	Mid-Bay Bridge (I-238 to I-380) (Crossing 2)	Build Road Capacity - High Cost	$19.9B	2	Yes	Even	Challenges	Even
3105	51	SR-12 Widening (I-80 to Rio Vista)	Build Road Capacity - Low Cost	$2.5B	2	Yes	Even	Challenges	Even
2600	52	WETA Ferry Service Frequency Increase	Enhance Alternate Modes	$0.4B	0	Yes	Challenges	Even	Even
3104	53	I-80/I-680/SR-12 Interchange + Widening (Phases 2B-7)	Build Road Capacity - Low Cost	$0.7B	2	Yes	Challenges	Even	Even
2202	54	BART DMU Extension to Brentwood	Extend Rail Network - Low Cost	$0.6B	0	No	Advances	Challenges	Challenges
3100	55	SR-239 Widening (Brentwood to Tracy including airport connector)	Build Road Capacity - Low Cost	$2.4B	1	No	Challenges	Advances	Challenges
2700	56	Bay Bridge West Span Bike Path	Enhance Alternate Modes	$0.8B	0	Yes	Even	Challenges	Challenges
2305	57	SMART to Solano (Novato to Suisun City, without sea level rise protections)	Extend Rail Network - Low Cost	$1.6B	0	Yes	Even	Challenges	Challenges
2304	58	SMART Extension to Cloverdale	Extend Rail Network - Low Cost	$0.5B	0	No	Challenges	Even	Challenges
2303	59	Caltrain Full Electrification and Blended System: High Growth	Optimize Existing Transit Network - High Cost	$36.9B	2	Yes	Challenges	Even	Challenges
2302	60	Caltrain Full Electrification and Blended System: Moderate Growth	Optimize Existing Transit Network - High Cost	$24.6B	2	Yes	Challenges	Even	Challenges
2408	61	Muni Metro T-Third Extension to South San Francisco	Build Local Transit	$1.8B	0	Yes	Challenges	Challenges	Even
3003	62	San Francisco Arterial HOV and Freeway HOT Lanes	Optimize Existing Freeway Network	$1.3B	0	Yes	Challenges	Challenges	Even

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							Equity Score		
Project ID	Row ID	Project	Project Type	Lifecycle Cost	Guiding Principle Flags	Provides Point of Access in CoC?	Rising Tides Falling Fortunes	Clean and Green	Back to the Future
3102	63	SR-4 Operational Improvements	Build Road Capacity - Low Cost	$0.5B	1	Yes	Challenges	Challenges	Even
7004	64	SR-84 Resilience Project (Dumbarton Bridge, 101 interchange)	Resilience	$0.2B	0	Yes	Challenges	n/a	n/a
7003	65	US-101 Peninsula Resilience Project (San Antonio Rd, Poplar Ave, Millbrae Ave)	Resilience	$0.2B	0	Yes	Challenges	n/a	n/a
7006	66	I-880 Resilience Project (South Fremont)	Resilience	$0.1B	0	Yes	Challenges	n/a	n/a
3000	67	Regional Express Lanes (MTC + VTA + ACTC + US-101)	Build Road Capacity - High Cost	$12.1B	1	Yes	Challenges	in progress	Challenges
5000	68	Bay Area Forward (Phase 1: Freeway Ramp and Arterial Components Only)	Optimize Existing Freeway Network	$0.6B	1	Yes	Challenges	in progress	Challenges
7002	69	I-580/US-101/SMART Marin Resilience Project	Resilience	$0.2B	0	Yes	Challenges	Challenges	Challenges
2300	70	Caltrain Downtown Extension	Build Core Rail	$4.8B	0	No	Challenges	Challenges	Challenges
2002	71	AC Transit Transbay Network: Capital Improvements + Service Increase	Optimize Existing Freeway Network	$6.5B	0	Yes	Challenges	Challenges	Challenges
2310	72	Megaregional Rail Network + Resilience Project (Caltrain, ACE, Valley Link, Dumbarton, Cap Cor)	Build Core Rail	$54.1B	2	Yes	Challenges	Challenges	Challenges
4003	73	Cupertino-Mountain View-San Jose Elevated Maglev Rail Loop	Build Local Transit	$8.1B	1	Yes	Challenges	Challenges	Challenges
2203	74	BART to Hercules & I-80 Bus from Vallejo to Oakland	Extend Rail Network - High Cost	$5.8B	0	Yes	Challenges	Challenges	Challenges
3001	75	Treasure Island Congestion Pricing	Optimize Existing Transit Network - Low Cost	$0.8B	1	Yes	Challenges	Challenges	Challenges
3002	76	Downtown San Francisco Congestion Pricing	Optimize Existing Transit Network - Low Cost	$0.3B	1	Yes	Challenges	Challenges	Challenges
3200	77	SR-37 Long Term Project (Tolling, Elevation, Interchanges, Widening, Express Bus)	Resilience	$5.4B	2	Yes	Challenges	Challenges	Challenges
4004	78	Regional Hovercraft Network	Enhance Alternate Modes		0	Yes	modeling in progress		
7000	79	BART Caldecott Tunnel Resilience Project	Resilience		0	No	modeling in progress		
2307	80	ACE Service Expansion and Capital Improvements (to San Joaquin Valley)	Extend Rail Network - High Cost		0	Yes	modeling in progress		
2309	81	Altamont Vision Phase 1 (to San Joaquin Valley)	Extend Rail Network - High Cost		0	Yes	modeling in progress		
6001	82	Bus Rapid Transit (BRT) on All Bridges	Optimize Existing Freeway Network		0	Yes	modeling in progress		
6002	83	SMART to Richmond via New Richmond-San Rafael Bridge	Build Core Rail		2	Yes	modeling in progress		
6003	84	I-80 Corridor Overhaul	Optimize Existing Freeway Network		1	Yes	modeling in progress		
6020	85	Regional Express Bus Network + Optimized Express Lane Network	Optimize Existing Freeway Network		1	Yes	modeling in progress		
6100	86	Integrated Transit Fare System	Optimize Existing Transit Network - Low Cost		0	Yes	modeling in progress		
6101	87	Free Transit	Optimize Existing Transit Network - Low Cost		1	Yes	modeling in progress		
6102	88	Higher-Occupancy HOV Lanes with VMT fee for SOV	Optimize Existing Freeway Network		1	Yes	modeling in progress		
6103	89	Demand-Based Tolls on All Highways	Optimize Existing Freeway Network		1	Yes	modeling in progress		
6104	90	Reversible Lanes on Congested Bridges and Freeways	Optimize Existing Freeway Network		1	Yes	modeling in progress		
6005	91	Regional Bicycle Superhighway Network	Enhance Alternate Modes		0	Yes	cannot be modeled		
6004	92	Bay Trail Completion	Enhance Alternate Modes		0	Yes	cannot be modeled		
6105	93	Freight Delivery Timing Regulation	Optimize Existing Freeway Network		1	Yes	cannot be modeled		

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Project Type	Project ID	Row ID	Project	Affordable	Connected	Diverse	Healthy	Vibrant
Build Core Rail	1002	1	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 3: Mission St)	Supports	Supports	Supports	Supports	Supports
	1003	2	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 4: New Markets)	Supports	Supports	Supports	Supports	Supports
	1004	3	New San Francisco-Oakland Transbay Rail Crossing - Commuter Rail (Crossing 5)	Supports	Supports	Does Not Support	Supports	Does Not Support
	1007	4	New San Francisco-Oakland Transbay Rail Crossing - BART + Commuter Rail (Crossing 7)	Supports	Supports	Does Not Support	Supports	Does Not Support
	2205	5	BART to Silicon Valley (Phase 2)	Supports	Supports	Supports	Supports	Supports
	2208	6	BART Gap Closure (Millbrae to Silicon Valley)	Supports	Supports	Supports	Supports	Supports
	2300	7	Caltrain Downtown Extension	Supports	Supports	Supports	Supports	Supports
	2306	8	Dumbarton Rail (Redwood City to Union City)	Supports	Supports	Supports	Supports	Supports
	2310	9	Megaregional Rail Network + Resilience Project (Caltrain, ACE, Valley Link, Dumbarton, Cap Cor)	Supports	Supports	Does Not Support	Supports	Does Not Support
	6002	10	SMART to Richmond via New Richmond-San Rafael Bridge	Supports	Supports	Does Not Support	Supports	Does Not Support
Extend Rail Network - High Cost	2203	11	BART to Hercules & I-80 Bus from Vallejo to Oakland	Supports	Supports	Supports	Supports	Supports
	2204	12	BART on I-680 (Walnut Creek to West Dublin/Pleasanton)	Supports	Supports	Supports	Supports	Supports
	2206	13	BART Extension from Diridon to Cupertino	Supports	Supports	Supports	Supports	Supports
	2207	14	BART Extension from Diridon to Gilroy (replacing existing Caltrain)	Does Not Support	Supports	Supports	Supports	Supports
	2307	15	ACE Service Expansion and Capital Improvements (to San Joaquin Valley)	Supports	Supports	Supports	Supports	Supports
	2308	16	Valley Link (Dublin to San Joaquin Valley)	Supports	Supports	Supports	Supports	Supports
	2309	17	Altamont Vision Phase 1 (to San Joaquin Valley)	Supports	Supports	Supports	Supports	Supports
Extend Rail Network - Low Cost	2202	18	BART DMU Extension to Brentwood	Supports	Supports	Supports	Supports	Supports
	2304	19	SMART Extension to Cloverdale	Supports	Supports	Supports	Supports	Supports
	2305	20	SMART to Solano (Novato to Suisun City, without sea level rise protections)	Supports	Supports	Supports	Supports	Supports
Optimize Existing Transit Network - High Cost	2001	21	AC Transit Local Rapid Network: Capital Improvements + Service Increase	Supports	Supports	Supports	Supports	Supports
	2005	22	Alameda County BRT Network + Connected Vehicle Corridors	Supports	Supports	Supports	Supports	Supports
	2201	23	BART Core Capacity	Supports	Supports	Supports	Supports	Supports
	2301	24	Caltrain Full Electrification and Blended System: Base Growth	Supports	Supports	Does Not Support	Supports	Does Not Support
	2302	25	Caltrain Full Electrification and Blended System: Moderate Growth	Supports	Supports	Does Not Support	Supports	Does Not Support
	2303	26	Caltrain Full Electrification and Blended System: High Growth	Supports	Supports	Does Not Support	Supports	Does Not Support
	2401	27	North San Jose LRT Subway	Supports	Supports	Supports	Supports	Supports
	2407	28	Muni Metro Southwest M-Line Subway	Supports	Supports	Supports	Supports	Supports
	2409	29	VTA LRT Systemwide Grade Separation	Supports	Supports	Supports	Supports	Supports
	2410	30	VTA LRT Systemwide Grade Separation and Full Automation	Supports	Supports	Supports	Supports	Does Not Support
	2411	31	VTA LRT Systemwide Grade Separation, Network Expansion, and Full Automation	Supports	Supports	Supports	Supports	Supports
Optimize Existing Transit Network - Low Cost	2000	32	AC Transit Local Network: Service Increase	Supports	Supports	Supports	Supports	Supports
	2003	33	Muni Forward: Capital Improvements + Service Increase	Supports	Supports	Supports	Supports	Supports
	2004	34	Sonoma Countywide Bus: Service Increase	Supports	Supports	Supports	Supports	Supports
	2007	35	San Francisco Southeast Waterfront Transit Improvements	Supports	Supports	Supports	Supports	Supports
	2008	36	Alameda Point Transit Network Improvements	Supports	Supports	Supports	Supports	Supports

Questions to determine Guiding Principle flags:
Affordable: Does the project increase travel costs for lower income residents?
Connected: Does the project significantly increase travel times or eliminate travel options?
Diverse: Does the project displace lower-income residents or divide communities (as a direct impact of project construction)?
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Vibrant: Does the project directly eliminate jobs?

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Optimize Existing Transit Network - Low Cost	2100	37	San Pablo BRT	Supports	Supports	Supports	Supports	Supports
	2101	38	Geary BRT (Phase 2)	Supports	Supports	Supports	Supports	Supports
	2103	39	SamTrans El Camino Real BRT: Capital and Service Improvements	Supports	Supports	Supports	Supports	Supports
	2105	40	Alameda County E14th St/Mission and Fremont Blvd Multimodal Corridor	Supports	Supports	Supports	Supports	Supports
	2209	41	Irvington BART Infill Station	Supports	Supports	Supports	Supports	Supports
	2400	42	Downtown San Jose LRT Subway	Supports	Supports	Supports	Supports	Supports
	3001	43	Treasure Island Congestion Pricing	Does Not Support	Supports	Supports	Supports	Supports
	3002	44	Downtown San Francisco Congestion Pricing	Does Not Support	Supports	Supports	Supports	Supports
	6100	45	Integrated Transit Fare System	Supports	Supports	Supports	Supports	Supports
	6101	46	Free Transit	Supports	Supports	Supports	Supports	Does Not Support
Build Local Transit	2402	47	San Jose Airport People Mover	Supports	Supports	Supports	Supports	Supports
	2403	48	Vasona LRT Extension (Phase 2)	Supports	Supports	Supports	Supports	Supports
	2408	49	Muni Metro T-Third Extension to South San Francisco	Supports	Supports	Supports	Supports	Supports
	2412	50	SR-85 LRT (Mountain View to US101 interchange)	Supports	Supports	Supports	Supports	Supports
	4000	51	Oakland/Alameda Gondola Network	Supports	Supports	Supports	Supports	Does Not Support
	4001	52	Mountain View AV Network (Free Fare, Subsidies from Companies)	Supports	Supports	Supports	Supports	Does Not Support
	4002	53	Contra Costa Autonomous Shuttle Program	Supports	Supports	Supports	Supports	Supports
	4003	54	Cupertino-Mountain View-San Jose Elevated Maglev Rail Loop	Supports	Supports	Supports	Supports	Does Not Support
	5003	55	I-680 Corridor Improvements (BRT, Express Bus, Shared AVs, Gondolas)	Supports	Supports	Supports	Supports	Supports
Enhance Alternate Modes	2600	56	WETA Ferry Service Frequency Increase	Supports	Supports	Supports	Supports	Supports
	2601	57	WETA Ferry Network Expansion (Berkeley, Alameda Pt, Redwood City, Mission Bay, Treasure Isla..	Supports	Supports	Supports	Supports	Supports
	2700	58	Bay Bridge West Span Bike Path	Supports	Supports	Supports	Supports	Supports
	4004	59	Regional Hovercraft Network	Supports	Supports	Supports	Supports	Supports
	6004	60	Bay Trail Completion	Supports	Supports	Supports	Supports	Supports
	6005	61	Regional Bicycle Superhighway Network	Supports	Supports	Supports	Supports	Supports
	6006	62	Enhanced Regionwide Bike Infrastructure	Supports	Supports	Supports	Supports	Supports
Build Road Capacity - High Cost	1001	63	Southern Crossing Bridge + New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 6)	Supports	Supports	Does Not Support	Supports	Supports
	1005	64	Mid-Bay Bridge (I-238 to I-380) (Crossing 2)	Supports	Supports	Supports	Does Not Support	Does Not Support
	1006	65	San Mateo Bridge Reconstruction and Widening (Crossing 1)	Supports	Supports	Supports	Does Not Support	Supports
	3000	66	Regional Express Lanes (MTC + VTA + ACTC + US-101)	Supports	Supports	Supports	Does Not Support	Supports
Build Road Capacity - Low Cost	3100	67	SR-239 Widening (Brentwood to Tracy including airport connector)	Supports	Supports	Supports	Does Not Support	Supports
	3101	68	I-680/SR-4 Interchange Improvements (Direct/HOV Connectors, Ramp Widening, Auxiliary Lanes)	Supports	Supports	Supports	Does Not Support	Supports
	3102	69	SR-4 Operational Improvements	Supports	Supports	Supports	Does Not Support	Supports
	3103	70	SR-4 Widening (Brentwood to Discovery Bay)	Supports	Supports	Supports	Does Not Support	Supports
	3104	71	I-80/I-680/SR-12 Interchange + Widening (Phases 2B-7)	Supports	Supports	Supports	Does Not Support	Does Not Support
	3105	72	SR-12 Widening (I-80 to Rio Vista)	Does Not Support	Supports	Supports	Does Not Support	Supports

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Build Road Capacity - Low Cost	3106	73	SR-152 Realignment and Tolling	Does Not Support	Supports	Supports	Does Not Support	Supports
	3109	74	SR-262 Widening and Interchange Improvements	Supports	Supports	Does Not Support	Does Not Support	Supports
	3110	75	Union City-Fremont East-West Connector	Supports	Supports	Supports	Does Not Support	Supports
Optimize Existing Freeway Network	2002	76	AC Transit Transbay Network: Capital Improvements + Service Increase	Supports	Supports	Supports	Supports	Supports
	3003	77	San Francisco Arterial HOV and Freeway HOT Lanes	Supports	Supports	Supports	Supports	Supports
	5000	78	Bay Area Forward (Phase 1: Freeway Ramp and Arterial Components Only)	Supports	Supports	Supports	Does Not Support	Supports
	6001	79	Bus Rapid Transit (BRT) on All Bridges	Supports	Supports	Supports	Supports	Supports
	6003	80	I-80 Corridor Overhaul	Does Not Support	Supports	Supports	Supports	Supports
	6020	81	Regional Express Bus Network + Optimized Express Lane Network	Supports	Supports	Does Not Support	Supports	Supports
	6102	82	Higher-Occupancy HOV Lanes with VMT fee for SOV	Does Not Support	Supports	Supports	Supports	Supports
	6103	83	Demand-Based Tolls on All Highways	Does Not Support	Supports	Supports	Supports	Supports
	6104	84	Reversible Lanes on Congested Bridges and Freeways	Supports	Supports	Supports	Does Not Support	Supports
	6105	85	Freight Delivery Timing Regulation	Supports	Does Not Support	Supports	Supports	Supports
Resilience	3200	86	SR-37 Long Term Project (Tolling, Elevation, Interchanges, Widening, Express Bus)	Does Not Support	Supports	Supports	Does Not Support	Supports
	7000	87	BART Caldecott Tunnel Resilience Project	Supports	Supports	Supports	Supports	Supports
	7001	88	VTA LRT Resilience Project (Tasman West)	Supports	Supports	Supports	Supports	Supports
	7002	89	I-580/US-101/SMART Marin Resilience Project	Supports	Supports	Supports	Supports	Supports
	7003	90	US-101 Peninsula Resilience Project (San Antonio Rd, Poplar Ave, Millbrae Ave)	Supports	Supports	Supports	Supports	Supports
	7004	91	SR-84 Resilience Project (Dumbarton Bridge, 101 interchange)	Supports	Supports	Supports	Supports	Supports
	7005	92	SR-237 Resilience Project (Alviso)	Supports	Supports	Supports	Supports	Supports
	7006	93	I-880 Resilience Project (South Fremont)	Supports	Supports	Supports	Supports	Supports

Questions to determine Guiding Principle flags:
Affordable: Does the project increase travel costs for lower income residents?
Connected: Does the project significantly increase travel times or eliminate travel options?
Diverse: Does the project displace lower-income residents or divide communities (as a direct impact of project construction)?
Healthy: Does the project significantly increase emissions or collisions?
Vibrant: Does the project directly eliminate jobs?

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All values in billions of 2019 dollars discounted present value

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Build Core Rail	1002	1	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 3: Mission St)	Rising Tides Falling Fortunes	**$21.3B**	$6.6B	$7.9B	$1.9B	$0.1B	$4.1B	$0.6B
				Clean and Green	**$45.4B**	$19.0B	$18.8B	$2.0B	$0.0B	$5.2B	$0.5B
				Back to the Future	**$42.3B**	$19.9B	$15.3B	$2.1B	$0.1B	$4.4B	$0.6B
	1003	2	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 4: New Markets)	Rising Tides Falling Fortunes	**$21.6B**	$7.0B	$7.2B	$1.9B	$0.2B	$4.6B	$0.7B
				Clean and Green	**$47.3B**	$19.3B	$19.8B	$1.8B	$0.0B	$6.0B	$0.5B
				Back to the Future	**$42.7B**	$19.2B	$15.8B	$2.1B	$0.1B	$4.9B	$0.7B
	1004	3	New San Francisco-Oakland Transbay Rail Crossing - Commuter Rail (Crossing 5)	Rising Tides Falling Fortunes	**$30.7B**	$14.0B	$7.1B	$1.6B	$0.3B	$5.8B	$1.9B
				Clean and Green	**$79.3B**	$48.4B	$18.6B	$2.1B	$0.0B	$8.6B	$1.6B
				Back to the Future	**$98.0B**	$64.6B	$17.8B	$3.7B	$0.2B	$9.1B	$2.6B
	1007	4	New San Francisco-Oakland Transbay Rail Crossing - BART + Commuter Rail (Crossing 7)	Rising Tides Falling Fortunes	**$47.1B**	$20.9B	$10.6B	$3.0B	$0.4B	$9.7B	$2.4B
				Clean and Green	**$121.0B**	$68.0B	$34.2B	$3.6B	($0.1B)	$13.1B	$2.1B
				Back to the Future	**$114.0B**	$71.8B	$22.0B	$5.3B	$0.2B	$11.9B	$2.7B
	2205	5	BART to Silicon Valley (Phase 2)	Rising Tides Falling Fortunes	**$0.5B**	$0.3B	($0.3B)	$0.2B	$0.0B	$0.1B	$0.2B
				Clean and Green	**$2.3B**	$1.8B	($0.1B)	$0.2B	$0.0B	$0.3B	$0.2B
				Back to the Future	**$3.7B**	$3.5B	($1.5B)	$1.1B	$0.0B	$0.4B	$0.2B
	2208	6	BART Gap Closure (Millbrae to Silicon Valley)	Rising Tides Falling Fortunes	**$0.5B**	$0.3B	($0.2B)	$0.1B	$0.0B	$0.1B	$0.1B
				Clean and Green	**$3.8B**	$1.7B	$1.3B	$0.4B	$0.0B	$0.3B	$0.2B
				Back to the Future	**$5.4B**	$3.7B	$0.1B	$1.0B	$0.0B	$0.3B	$0.3B
	2300	7	Caltrain Downtown Extension	Rising Tides Falling Fortunes	**$1.9B**	$1.4B	$0.2B	$0.0B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$3.4B**	$3.2B	($0.1B)	$0.0B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$3.0B**	$2.4B	$0.8B	($0.3B)	$0.0B	$0.0B	$0.1B
	2306	8	Dumbarton Rail (Redwood City to Union City)	Rising Tides Falling Fortunes	**($0.5B)**	$0.3B	($0.2B)	($0.6B)	($0.3B)	$0.1B	$0.1B
				Clean and Green	**$0.8B**	$0.9B	($0.3B)	$0.3B	($0.3B)	$0.1B	$0.1B
				Back to the Future	**$1.9B**	$1.7B	$0.3B	$0.0B	($0.3B)	$0.0B	$0.1B
	2310	9	Megaregional Rail Network + Resilience Project	Rising Tides Falling Fortunes	**$9.0B**	$5.6B	$1.9B	$0.7B	($0.7B)	$0.9B	$0.6B

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Build Core Rail	2310	9	Megaregional Rail Network + Resilience Project (Caltrain, ACE, Valley Link, Dumbarton, Cap Cor)	Clean and Green	**$26.8B**	$14.0B	$10.7B	$1.0B	($0.8B)	$1.3B	$0.6B
				Back to the Future	**$21.5B**	$14.6B	$4.4B	$1.6B	($0.8B)	$1.1B	$0.7B
Extend Rail Network - High Cost	2203	10	BART to Hercules & I-80 Bus from Vallejo to Oakland	Rising Tides Falling Fortunes	**$0.4B**	$0.8B	($1.0B)	$0.1B	$0.1B	$0.3B	$0.2B
				Clean and Green	**$0.1B**	$1.4B	($1.6B)	($0.1B)	$0.0B	$0.2B	$0.1B
				Back to the Future	**$1.4B**	$1.4B	($0.6B)	$0.3B	$0.0B	$0.1B	$0.1B
	2204	11	BART on I-680 (Walnut Creek to West Dublin/Pleasanton)	Rising Tides Falling Fortunes	**($0.2B)**	($0.1B)	($0.2B)	$0.2B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$1.6B**	$0.6B	$1.0B	$0.0B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$0.2B**	$0.3B	$0.0B	$0.0B	$0.0B	$0.0B	$0.0B
	2206	12	BART Extension from Diridon to Cupertino	Rising Tides Falling Fortunes	**$1.1B**	$0.6B	($0.2B)	$0.3B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$2.9B**	$1.8B	$0.4B	$0.0B	$0.0B	$0.4B	$0.2B
				Back to the Future	**$5.1B**	$4.5B	($0.4B)	$0.3B	$0.0B	$0.5B	$0.2B
	2207	13	BART Extension from Diridon to Gilroy (replacing existing Caltrain)	Rising Tides Falling Fortunes	**$0.3B**	$0.3B	($0.1B)	$0.1B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$2.0B**	$0.8B	$0.6B	$0.4B	$0.0B	$0.2B	$0.1B
				Back to the Future	**$3.0B**	$1.9B	$0.2B	$0.5B	$0.0B	$0.3B	$0.1B
	2308	14	Valley Link (Dublin to San Joaquin Valley)	Rising Tides Falling Fortunes	**($0.3B)**	$0.7B	($0.4B)	($1.4B)	$0.0B	$0.5B	$0.2B
				Clean and Green	**$4.1B**	$2.0B	$2.0B	($0.1B)	$0.0B	$0.2B	$0.1B
				Back to the Future	**$3.9B**	$3.2B	($0.6B)	$0.6B	$0.0B	$0.3B	$0.3B
Extend Rail Network - Low Cost	2202	15	BART DMU Extension to Brentwood	Rising Tides Falling Fortunes	**($0.2B)**	$0.1B	($0.1B)	($0.2B)	$0.0B	$0.1B	$0.0B
				Clean and Green	**$0.3B**	$0.3B	($0.2B)	$0.1B	$0.0B	$0.1B	$0.0B
				Back to the Future	**($0.1B)**	$0.1B	($0.2B)	$0.0B	$0.0B	$0.0B	$0.0B
	2304	16	SMART Extension to Cloverdale	Rising Tides Falling Fortunes	**$0.1B**	$0.2B	($0.1B)	($0.2B)	$0.0B	$0.1B	$0.0B
				Clean and Green	**$0.1B**	$0.0B	$0.1B	($0.1B)	$0.0B	$0.0B	$0.0B
				Back to the Future	**($0.4B)**	($0.4B)	($0.4B)	$0.2B	$0.0B	$0.1B	$0.0B
	2305	17	SMART to Solano (Novato to Suisun City, without sea level rise protections)	Rising Tides Falling Fortunes	**($0.1B)**	$0.1B	($0.1B)	($0.1B)	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.2B**	$0.2B	$0.0B	($0.1B)	$0.0B	$0.0B	$0.1B

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Extend Rail Network - Low Cost	2305	17	SMART to Solano (Novato to Suisun City, without sea level rise protections)	Back to the Future	**$0.0B**	($0.4B)	$0.2B	$0.2B	$0.0B	$0.1B	$0.0B
Optimize Existing Transit Network - High Cost	2001	18	AC Transit Local Rapid Network: Capital Improvements + Service Increase	Rising Tides Falling Fortunes	**$3.5B**	$0.6B	$0.0B	$2.1B	$0.1B	$0.3B	$0.4B
				Clean and Green	**$3.9B**	$1.3B	($0.6B)	$2.4B	$0.0B	$0.4B	$0.4B
				Back to the Future	**$5.3B**	$2.7B	($1.3B)	$2.8B	$0.0B	$0.4B	$0.7B
	2005	19	Alameda County BRT Network + Connected Vehicle Corridors	Rising Tides Falling Fortunes	**$1.0B**	$0.4B	($0.2B)	$0.3B	$0.0B	$0.3B	$0.1B
				Clean and Green	**$1.5B**	$0.4B	($0.2B)	$1.0B	$0.0B	$0.2B	$0.1B
				Back to the Future	**$2.6B**	$1.6B	$0.1B	$0.7B	$0.0B	$0.1B	$0.2B
	2201	20	BART Core Capacity	Rising Tides Falling Fortunes	**$4.4B**	$0.7B	$3.0B	$0.4B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$9.8B**	$1.5B	$7.9B	$0.0B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$10.2B**	$2.8B	$6.6B	$0.6B	$0.0B	$0.2B	$0.1B
	2301	21	Caltrain Full Electrification and Blended System: Base Growth	Rising Tides Falling Fortunes	**$3.1B**	$1.1B	$1.2B	$0.1B	$0.0B	$0.1B	$0.6B
				Clean and Green	**$4.9B**	$3.5B	$0.6B	$0.0B	$0.0B	$0.1B	$0.8B
				Back to the Future	**$4.4B**	$2.4B	$1.2B	$0.2B	$0.0B	$0.0B	$0.6B
	2302	22	Caltrain Full Electrification and Blended System: Moderate Growth	Rising Tides Falling Fortunes	**$6.8B**	$3.6B	$1.7B	$0.3B	$0.1B	$0.3B	$0.8B
				Clean and Green	**$22.9B**	$12.2B	$8.5B	$0.4B	$0.0B	$0.8B	$1.0B
				Back to the Future	**$12.7B**	$7.8B	$2.7B	$0.8B	$0.0B	$0.5B	$0.8B
	2303	23	Caltrain Full Electrification and Blended System: High Growth	Rising Tides Falling Fortunes	**$9.9B**	$5.5B	$2.0B	$0.5B	$0.1B	$0.6B	$1.3B
				Clean and Green	**$35.8B**	$18.6B	$13.3B	$0.9B	$0.0B	$1.3B	$1.7B
				Back to the Future	**$19.2B**	$11.7B	$4.1B	$1.2B	$0.1B	$1.0B	$1.2B
	2401	24	North San Jose LRT Subway	Rising Tides Falling Fortunes	**$0.0B**	($0.1B)	($0.2B)	$0.3B	$0.0B	$0.0B	$0.1B
				Clean and Green	**$0.7B**	($0.4B)	$0.7B	$0.1B	$0.0B	$0.2B	$0.2B
				Back to the Future	**$2.4B**	$1.2B	$0.2B	$0.6B	$0.0B	$0.3B	$0.2B
	2407	25	Muni Metro Southwest M-Line Subway	Rising Tides Falling Fortunes	**$0.4B**	($0.2B)	$0.4B	$0.1B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$1.4B**	($0.3B)	$1.7B	($0.1B)	$0.0B	$0.0B	$0.0B
				Back to the Future	**$2.0B**	$0.2B	$1.2B	$0.4B	$0.0B	$0.2B	$0.0B

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Optimize Existing Transit Network - High Cost	2409	26	VTA LRT Systemwide Grade Separation	Rising Tides Falling Fortunes	**$0.7B**	($0.1B)	($0.2B)	$0.4B	$0.0B	$0.2B	$0.4B
				Clean and Green	**$2.6B**	$1.1B	$0.5B	$0.3B	$0.0B	$0.3B	$0.4B
				Back to the Future	**$5.6B**	$2.9B	$1.1B	$0.7B	$0.0B	$0.3B	$0.5B
	2410	27	VTA LRT Systemwide Grade Separation and Full Automation	Rising Tides Falling Fortunes	**$1.9B**	$0.6B	($0.6B)	$0.9B	$0.0B	$0.4B	$0.6B
				Clean and Green	**$5.7B**	$3.4B	($0.4B)	$1.3B	$0.0B	$0.8B	$0.7B
				Back to the Future	**$10.2B**	$6.2B	($0.1B)	$2.3B	$0.0B	$1.0B	$0.7B
	2411	28	VTA LRT Systemwide Grade Separation, Network Expansion, and Full Automation	Rising Tides Falling Fortunes	**$4.2B**	$1.9B	($0.9B)	$1.1B	$0.1B	$1.1B	$0.9B
				Clean and Green	**$9.1B**	$5.6B	($1.9B)	$2.4B	$0.0B	$2.1B	$0.8B
				Back to the Future	**$16.0B**	$10.3B	($0.9B)	$3.0B	$0.1B	$2.5B	$1.1B
Optimize Existing Transit Network - Low Cost	2000	29	AC Transit Local Network: Service Increase	Rising Tides Falling Fortunes	**$3.2B**	$0.5B	$0.5B	$1.6B	$0.0B	$0.3B	$0.3B
				Clean and Green	**$5.9B**	$1.7B	$1.9B	$1.7B	$0.0B	$0.3B	$0.2B
				Back to the Future	**$5.9B**	$3.5B	($0.2B)	$1.9B	$0.0B	$0.3B	$0.2B
	2003	30	Muni Forward: Capital Improvements + Service Increase	Rising Tides Falling Fortunes	**$2.0B**	$0.6B	$0.8B	$0.1B	$0.0B	($0.1B)	$0.6B
				Clean and Green	**$4.4B**	$0.7B	$2.8B	$0.5B	$0.0B	($0.1B)	$0.6B
				Back to the Future	**$3.4B**	$0.6B	$2.1B	$0.3B	$0.0B	($0.1B)	$0.6B
	2004	31	Sonoma Countywide Bus: Service Increase	Rising Tides Falling Fortunes	**$0.2B**	$0.0B	$0.0B	$0.0B	$0.0B	$0.1B	$0.1B
				Clean and Green	**$0.2B**	$0.0B	($0.2B)	$0.4B	$0.0B	$0.0B	$0.1B
				Back to the Future	**$1.3B**	$0.7B	$0.2B	$0.4B	$0.0B	$0.0B	$0.0B
	2007	32	San Francisco Southeast Waterfront Transit Improvements	Rising Tides Falling Fortunes	**$1.0B**	$0.4B	$0.5B	$0.2B	$0.0B	($0.1B)	$0.0B
				Clean and Green	**$1.6B**	$0.2B	$1.4B	$0.0B	$0.0B	($0.1B)	$0.0B
				Back to the Future	**$2.2B**	$0.8B	$1.1B	$0.4B	$0.0B	($0.1B)	$0.0B
	2008	33	Alameda Point Transit Network Improvements	Rising Tides Falling Fortunes	**$0.4B**	$0.2B	$0.1B	$0.0B	$0.0B	$0.1B	$0.0B
				Clean and Green	**$1.4B**	$0.3B	$1.0B	$0.0B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$1.8B**	$1.5B	$0.0B	$0.3B	$0.0B	$0.1B	$0.0B
	2100	34	San Pablo BRT	Rising Tides Falling Fortunes	**$0.6B**	$0.2B	($0.1B)	$0.0B	$0.0B	$0.2B	$0.3B

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All values in billions of 2019 dollars discounted present value

Project Type	Project ID	Row ID	Project	Future	Grand Total	Accessibility Benefits	Transit Crowding Benefits	Freeway Reliability and Vehicle Ownership Benefits	Environmental Benefits	Health Benefits	Safety Benefits
Optimize Existing Transit Network - Low Cost	2100	34	San Pablo BRT	Clean and Green	**$1.2B**	$0.2B	$0.5B	$0.2B	$0.0B	$0.1B	$0.3B
				Back to the Future	**$1.6B**	$0.6B	$0.2B	$0.3B	$0.0B	$0.2B	$0.3B
	2101	35	Geary BRT (Phase 2)	Rising Tides Falling Fortunes	**$0.9B**	$0.1B	$0.5B	($0.1B)	$0.0B	$0.1B	$0.3B
				Clean and Green	**$1.0B**	$0.1B	$0.8B	$0.0B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$1.8B**	$0.7B	$0.4B	$0.4B	$0.0B	$0.1B	$0.1B
	2103	36	SamTrans El Camino Real BRT: Capital and Service Improvements	Rising Tides Falling Fortunes	**$0.3B**	($0.1B)	$0.0B	$0.1B	$0.0B	$0.1B	$0.1B
				Clean and Green	**$0.7B**	$0.5B	$0.0B	$0.2B	$0.0B	$0.0B	$0.1B
				Back to the Future	**$0.4B**	$0.3B	$0.3B	($0.3B)	$0.0B	$0.0B	$0.0B
	2105	37	Alameda County E14th St/Mission and Fremont Blvd Multimodal Corridor	Rising Tides Falling Fortunes	**$0.6B**	$0.3B	($0.3B)	$0.2B	$0.0B	$0.2B	$0.2B
				Clean and Green	**$1.1B**	$0.3B	$0.0B	$0.5B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$0.8B**	$0.4B	($0.2B)	$0.3B	$0.0B	$0.1B	$0.2B
	2209	38	Irvington BART Infill Station	Rising Tides Falling Fortunes	**$0.3B**	$0.1B	$0.2B	$0.0B	$0.0B	($0.1B)	$0.1B
				Clean and Green	**$0.2B**	$0.8B	($0.9B)	$0.1B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$2.1B**	$2.1B	$0.2B	($0.2B)	$0.0B	$0.0B	$0.1B
	2400	39	Downtown San Jose LRT Subway	Rising Tides Falling Fortunes	**$0.2B**	$0.0B	($0.2B)	$0.4B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.3B**	$0.2B	($0.2B)	$0.2B	$0.0B	$0.1B	$0.0B
				Back to the Future	**$2.5B**	$1.5B	$0.1B	$0.6B	$0.0B	$0.2B	$0.1B
	3001	40	Treasure Island Congestion Pricing	Rising Tides Falling Fortunes	**$6.2B**	$5.4B	($0.6B)	$0.7B	$0.1B	$0.3B	$0.3B
				Clean and Green	**$5.6B**	$5.4B	($0.6B)	$0.3B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$11.3B**	$9.2B	$0.2B	$1.2B	$0.1B	$0.2B	$0.4B
	3002	41	Downtown San Francisco Congestion Pricing	Rising Tides Falling Fortunes	**$0.7B**	$0.2B	$0.3B	$0.2B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.9B**	$0.4B	$0.4B	($0.1B)	$0.0B	$0.1B	$0.0B
				Back to the Future	**$1.4B**	$0.5B	$0.4B	$0.4B	$0.0B	$0.1B	$0.0B
Build Local Transit	2402	42	San Jose Airport People Mover	Rising Tides Falling Fortunes	**$0.4B**	$0.1B	$0.0B	$0.2B	$0.0B	$0.0B	$0.1B
				Clean and Green	**$0.6B**	$0.1B	$0.4B	$0.2B	$0.0B	($0.1B)	$0.0B

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Build Local Transit	2402	42	San Jose Airport People Mover	Back to the Future	**($0.7B)**	($0.8B)	$0.0B	$0.1B	$0.0B	$0.1B	$0.0B
	2403	43	Vasona LRT Extension (Phase 2)	Rising Tides Falling Fortunes	**$0.2B**	($0.1B)	($0.1B)	$0.4B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.1B**	$0.2B	$0.0B	($0.1B)	$0.0B	$0.0B	$0.0B
				Back to the Future	**$0.4B**	$0.4B	($0.4B)	$0.4B	$0.0B	$0.0B	$0.0B
	2408	44	Muni Metro T-Third Extension to South San Francisco	Rising Tides Falling Fortunes	**($0.2B)**	$0.0B	($0.4B)	$0.2B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.6B**	$0.0B	$0.5B	$0.0B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$1.7B**	$1.0B	$0.2B	$0.4B	$0.0B	$0.0B	$0.1B
	2412	45	SR-85 LRT (Mountain View to US101 interchange)	Rising Tides Falling Fortunes	**$1.0B**	$0.5B	$0.0B	$0.2B	$0.0B	$0.3B	$0.1B
				Clean and Green	**$2.5B**	$0.8B	$1.1B	$0.2B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$2.3B**	$1.8B	$0.0B	$0.3B	$0.0B	$0.2B	$0.1B
	4000	46	Oakland/Alameda Gondola Network	Rising Tides Falling Fortunes	**$0.8B**	$0.5B	($0.1B)	$0.1B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$0.3B**	$0.1B	($0.1B)	$0.0B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$2.4B**	$2.0B	($0.6B)	$0.5B	$0.0B	$0.4B	$0.1B
	4001	47	Mountain View AV Network (Free Fare, Subsidies from Companies)	Rising Tides Falling Fortunes	**$0.4B**	$0.1B	($0.1B)	$0.0B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$1.2B**	$0.8B	($0.1B)	$0.4B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$1.5B**	$0.8B	$0.2B	$0.3B	$0.0B	$0.1B	$0.1B
	4002	48	Contra Costa Autonomous Shuttle Program	Rising Tides Falling Fortunes	**$0.7B**	$0.1B	($0.1B)	$0.4B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$1.2B**	$0.1B	$0.0B	$0.6B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$0.9B**	$0.4B	($0.1B)	$0.2B	$0.0B	$0.3B	$0.1B
	4003	49	Cupertino-Mountain View-San Jose Elevated Maglev Rail Loop	Rising Tides Falling Fortunes	**$0.4B**	$0.5B	($0.2B)	$0.0B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$2.5B**	$0.9B	$1.2B	$0.3B	$0.0B	$0.1B	$0.0B
				Back to the Future	**$2.7B**	$0.9B	$1.3B	$0.2B	$0.0B	$0.2B	$0.0B
	5003	50	I-680 Corridor Improvements (BRT, Express Bus, Shared AVs, Gondolas)	Rising Tides Falling Fortunes	**$1.2B**	$0.7B	($0.3B)	$0.4B	$0.0B	$0.2B	$0.1B
				Clean and Green	**$2.1B**	$1.1B	($0.5B)	$1.2B	$0.0B	$0.2B	$0.1B
				Back to the Future	**$2.8B**	$1.6B	$0.8B	$0.5B	$0.0B	$0.1B	$0.0B

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Enhance Alternate Modes	2600	51	WETA Ferry Service Frequency Increase	Rising Tides Falling Fortunes	**$0.7B**	$0.1B	$0.4B	$0.2B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$2.4B**	$0.5B	$1.5B	$0.2B	$0.0B	$0.2B	$0.1B
				Back to the Future	**$0.9B**	$0.4B	$0.5B	$0.1B	$0.0B	$0.0B	($0.1B)
	2601	52	WETA Ferry Network Expansion (Berkeley, Alameda Pt, Redwood City, Mission Bay, Treasure Island)	Rising Tides Falling Fortunes	**$1.1B**	$0.3B	$0.5B	($0.1B)	$0.0B	$0.3B	$0.2B
				Clean and Green	**$1.6B**	$0.5B	$1.0B	$0.1B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$2.1B**	$1.0B	$1.3B	($0.1B)	$0.0B	($0.1B)	$0.0B
	2700	53	Bay Bridge West Span Bike Path	Rising Tides Falling Fortunes	**($0.5B)**	($0.2B)	$0.0B	($0.2B)	$0.0B	$0.0B	$0.0B
				Clean and Green	**$1.1B**	$0.7B	$0.2B	$0.1B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$0.4B**	$0.1B	($0.2B)	$0.4B	$0.0B	$0.1B	$0.0B
	6006	54	Enhanced Regionwide Bike Infrastructure	Rising Tides Falling Fortunes	**$13.7B**	$9.8B	$1.0B	$0.0B	$0.2B	$1.2B	$1.4B
				Clean and Green	**$36.1B**	$28.5B	$4.3B	$0.6B	$0.0B	$1.6B	$1.2B
				Back to the Future	**$40.0B**	$31.1B	$4.0B	$1.3B	$0.1B	$1.8B	$1.7B
Build Road Capacity - High Cost	1001	55	Southern Crossing Bridge + New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 6)	Rising Tides Falling Fortunes	**$26.3B**	$11.9B	$7.6B	$1.2B	$0.1B	$5.0B	$0.5B
				Clean and Green	**$60.3B**	$30.4B	$18.6B	$1.7B	($0.2B)	$9.2B	$0.5B
				Back to the Future	**$73.2B**	$47.8B	$17.7B	$1.6B	$0.1B	$5.2B	$0.8B
	1005	56	Mid-Bay Bridge (I-238 to I-380) (Crossing 2)	Rising Tides Falling Fortunes	**$4.3B**	$4.3B	$0.2B	$0.3B	($0.1B)	($0.2B)	($0.3B)
				Clean and Green	**$7.9B**	$7.1B	$1.3B	($0.2B)	($0.1B)	($0.1B)	($0.2B)
				Back to the Future	**$21.1B**	$21.3B	$1.6B	($0.3B)	$0.0B	($1.4B)	($0.2B)
	1006	57	San Mateo Bridge Reconstruction and Widening (Crossing 1)	Rising Tides Falling Fortunes	**$0.1B**	($0.1B)	$0.1B	$0.0B	$0.0B	$0.1B	$0.0B
				Clean and Green	**($0.8B)**	($1.1B)	$0.3B	$0.2B	$0.0B	($0.1B)	$0.0B
				Back to the Future	**$2.4B**	$2.4B	$0.6B	$0.1B	$0.0B	($0.6B)	($0.1B)
	3000	58	Regional Express Lanes (MTC + VTA + ACTC + US-101)	Rising Tides Falling Fortunes	**$7.6B**	$6.3B	$0.1B	$1.7B	($0.2B)	($0.1B)	($0.2B)
				Back to the Future	**$18.8B**	$21.8B	$0.7B	$0.8B	($0.5B)	($0.9B)	($3.2B)
Build Road Capacity - Low Cost	3100	59	SR-239 Widening (Brentwood to Tracy including airport connector)	Rising Tides Falling Fortunes	**$0.7B**	$0.6B	$0.0B	$0.2B	($0.1B)	$0.0B	$0.1B
				Clean and Green	**$1.0B**	$0.8B	$0.4B	($0.2B)	($0.1B)	$0.1B	$0.1B

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Build Road Capacity - Low Cost	3100	59	SR-239 Widening (Brentwood to Tracy including airport connector)	Back to the Future	**$2.3B**	$2.3B	$0.0B	$0.0B	($0.1B)	$0.1B	$0.0B
	3101	60	I-680/SR-4 Interchange Improvements (Direct/HOV Connectors, Ramp Widening, Auxiliary Lanes)	Rising Tides Falling Fortunes	**($0.1B)**	$0.1B	$0.1B	($0.1B)	$0.0B	($0.1B)	$0.0B
				Clean and Green	**$1.0B**	$0.8B	$0.1B	$0.0B	$0.0B	$0.0B	$0.1B
				Back to the Future	**$1.4B**	$1.2B	$0.0B	$0.2B	$0.0B	$0.0B	$0.0B
	3102	61	SR-4 Operational Improvements	Rising Tides Falling Fortunes	**$0.0B**	$0.1B	($0.1B)	($0.1B)	$0.0B	$0.0B	$0.1B
				Clean and Green	**$0.5B**	$0.0B	$0.2B	$0.1B	$0.0B	$0.0B	$0.2B
				Back to the Future	**$1.1B**	$0.8B	($0.2B)	$0.2B	$0.0B	$0.1B	$0.1B
	3103	62	SR-4 Widening (Brentwood to Discovery Bay)	Rising Tides Falling Fortunes	**($0.3B)**	$0.1B	$0.0B	($0.4B)	$0.0B	$0.1B	$0.1B
				Clean and Green	**$0.1B**	$0.2B	($0.2B)	$0.2B	$0.0B	($0.1B)	$0.0B
				Back to the Future	**$2.5B**	$1.5B	$0.6B	$0.3B	$0.0B	$0.1B	$0.1B
	3104	63	I-80/I-680/SR-12 Interchange + Widening (Phases 2B-7)	Rising Tides Falling Fortunes	**$0.3B**	$0.1B	$0.0B	$0.0B	$0.0B	$0.0B	$0.2B
				Clean and Green	**$0.9B**	$0.3B	$0.4B	$0.0B	$0.0B	$0.0B	$0.2B
				Back to the Future	**$0.7B**	$0.3B	($0.2B)	$0.3B	$0.0B	$0.1B	$0.2B
	3105	64	SR-12 Widening (I-80 to Rio Vista)	Rising Tides Falling Fortunes	**$0.2B**	$0.1B	$0.0B	$0.2B	$0.0B	$0.0B	$0.0B
				Clean and Green	**$0.7B**	$0.5B	$0.0B	$0.1B	$0.0B	$0.1B	$0.1B
				Back to the Future	**$1.8B**	$1.6B	($0.4B)	$0.5B	$0.0B	$0.0B	$0.1B
	3106	65	SR-152 Realignment and Tolling	Rising Tides Falling Fortunes	**$4.5B**	$4.1B	$0.0B	$0.2B	$0.0B	$0.0B	$0.2B
				Clean and Green	**$0.1B**	$3.3B	$0.9B	($2.5B)	($0.4B)	($0.2B)	($0.9B)
				Back to the Future	**($0.9B)**	$4.9B	($0.6B)	($1.8B)	($0.6B)	$0.0B	($2.7B)
	3109	66	SR-262 Widening and Interchange Improvements	Rising Tides Falling Fortunes	**$0.2B**	$0.2B	($0.2B)	($0.4B)	$0.0B	$0.2B	$0.4B
				Clean and Green	**$0.4B**	$0.4B	$0.0B	($0.1B)	$0.0B	($0.1B)	$0.1B
				Back to the Future	**$1.2B**	$1.4B	$0.4B	($0.8B)	$0.0B	$0.0B	$0.1B
	3110	67	Union City-Fremont East-West Connector	Rising Tides Falling Fortunes	**$0.3B**	$0.1B	$0.1B	$0.1B	$0.0B	$0.0B	$0.1B
				Clean and Green	**$0.5B**	$0.2B	$0.1B	$0.2B	$0.0B	$0.0B	$0.0B
				Back to the Future	**$1.2B**	$1.1B	$0.2B	($0.1B)	$0.0B	$0.0B	$0.0B

Methodology Overview: All project impacts are measured against a uniform base transportation and land use network in each future, except Resilience projects, which are measured against a baseline where that asset is out of service (hence n/a in some futures).
Inter-regional projects: Since we are only able to model Bay Area benefits, we multiplied the benefits by a factor to reflect the ratio of expected ridership from outside the region. Valley Link benefit multiplier: 3.3; Caltrain/HSR benefit multiplier: 1.3 (the HSR multiplier is applied in Clean and Green only, the future where HSR is completely built out).
Description of benefits:
Accessibility Benefits: Represents change in accessibility benefits to all Bay Area residents as a result of the project
Transit Crowding Benefits: Captures the (dis)benefits associated with increase/decrease in crowding, since people may change their travel choices or be denied boarding, or experience discomfort in a crowded vehicle
Freeway Reliability and Vehicle Ownership Benefits: Reflects change in non-recurring vehicle delay on freeways, and the costs of change in vehicle ownership as a result of the project
Environmental Benefits: Captures monetary value of change in GHG emissions or impact on natural lands (wetlands, pastureland, farmland) due to the project
Health Benefits: Represents benefits from increased physical activity due to more walking/biking and reduction in air pollutants and noise
Safety Benefits: Captures decrease in injuries and collisions due to reduced VMT as well as operational and safety improvements such as freewayramp redesign or grade separations
(The full methodology can be found on our website)

Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment D: Detailed Table of Lifecycle Benefits by Future

Note 1: Total number of projects: 93; 81 projects from public agencies, 12 projects from public/NGOs that were jury finalists from the Transformative Projects process
Note 2: Findings are not shown for 4 public agency projects and the 12 jury finalists, since modelling and/or cost review are in progress
(see high-level description of methodology at the bottom of the page)

All values in billions of 2019 dollars discounted present value

Project Type	Project ID	Row ID	Project	Future	Grand Total	Accessibility Benefits	Transit Crowding Benefits	Freeway Reliability and Vehicle Ownership Benefits	Environmental Benefits	Health Benefits	Safety Benefits
Optimize Existing Freeway Network	2002	68	AC Transit Transbay Network: Capital Improvements + Service Increase	Rising Tides Falling Fortunes	**$3.2B**	$0.8B	$1.3B	$0.5B	$0.0B	$0.2B	$0.3B
				Clean and Green	**$4.9B**	$0.7B	$2.8B	$1.0B	$0.1B	$0.2B	$0.2B
				Back to the Future	**$6.2B**	$2.7B	$2.6B	$0.5B	$0.0B	$0.1B	$0.3B
	3003	69	San Francisco Arterial HOV and Freeway HOT Lanes	Rising Tides Falling Fortunes	**$0.7B**	$0.8B	$0.2B	($0.1B)	$0.0B	($0.1B)	$0.0B
				Clean and Green	**$1.1B**	$0.8B	$0.5B	($0.1B)	$0.0B	($0.1B)	$0.1B
				Back to the Future	**$3.2B**	$2.5B	$0.8B	$0.0B	$0.0B	($0.1B)	$0.1B
	5000	70	Bay Area Forward (Phase 1: Freeway Ramp and Arterial Components Only)	Rising Tides Falling Fortunes	**$4.3B**	$3.8B	$0.1B	$1.2B	($0.1B)	$0.0B	($0.7B)
				Back to the Future	**$3.5B**	$5.9B	$1.1B	$1.5B	($0.5B)	($0.6B)	($3.9B)
Resilience	3200	71	SR-37 Long Term Project (Tolling, Elevation, Interchanges, Widening, Express Bus)	Rising Tides Falling Fortunes	**$3.6B**	$2.1B	$0.7B	$0.3B	$0.5B	($0.2B)	$0.2B
				Clean and Green	**$2.5B**	$4.1B	$1.0B	($2.0B)	$0.4B	($0.3B)	($0.7B)
				Back to the Future	**($4.7B)**	($1.4B)	($0.1B)	($1.2B)	$0.4B	($0.3B)	($2.1B)
	7001	72	VTA LRT Resilience Project (Tasman West)	Rising Tides Falling Fortunes	**$1.0B**	$0.3B	$0.2B	$0.5B	$0.0B	$0.1B	$0.0B
				Clean and Green	**$1.1B**	$0.7B	($0.4B)	$0.3B	$0.0B	$0.3B	$0.1B
				Back to the Future	**$1.6B**	$1.6B	($1.2B)	$0.8B	$0.0B	$0.3B	$0.1B
	7002	73	I-580/US-101/SMART Marin Resilience Project	Rising Tides Falling Fortunes	**$12.0B**	$11.6B	$1.2B	$0.2B	($0.2B)	($0.5B)	($0.2B)
				Clean and Green	**$17.7B**	$17.1B	$1.6B	$0.0B	($0.3B)	($0.4B)	($0.3B)
				Back to the Future	**$20.0B**	$21.0B	$1.6B	($1.7B)	$0.0B	($0.8B)	$0.0B
	7003	74	US-101 Peninsula Resilience Project (San Antonio R..	Rising Tides Falling Fortunes	**$2.7B**	$2.8B	$0.6B	$0.1B	($0.1B)	($0.3B)	($0.4B)
	7004	75	SR-84 Resilience Project (Dumbarton Bridge, 101 in..	Rising Tides Falling Fortunes	**$4.7B**	$4.8B	$0.4B	$0.6B	($0.1B)	($0.3B)	($0.6B)
	7005	76	SR-237 Resilience Project (Alviso)	Rising Tides Falling Fortunes	**$2.2B**	$1.9B	$0.0B	$0.3B	$0.0B	($0.1B)	$0.2B
				Back to the Future	**$11.1B**	$11.8B	$1.9B	($1.7B)	($0.1B)	($0.7B)	($0.1B)
	7006	77	I-880 Resilience Project (South Fremont)	Rising Tides Falling Fortunes	**$4.0B**	$2.9B	$0.1B	$1.1B	($0.1B)	($0.1B)	$0.3B

Methodology Overview: All project impacts are measured against a uniform base transportation and land use network in each future, except Resilience projects, which are measured against a baseline where that asset is out of service (hence n/a in some futures).
Inter-regional projects: Since we are only able to model Bay Area benefits, we multiplied the benefits by a factor to reflect the ratio of expected ridership from outside the region. Valley Link benefit multiplier: 3.3; Caltrain/HSR benefit multiplier: 1.3 (the HSR multiplier is applied in Clean and Green only, the future where HSR is completely built out).
Description of benefits:
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Safety Benefits: Captures decrease in injuries and collisions due to reduced VMT as well as operational and safety improvements such as freewayramp redesign or grade separations
(The full methodology can be found on our website)

Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment E: Detailed Table of Lifecycle Costs

Note 1: Total number of projects: 93; 81 projects from public agencies, 12 projects from public/NGOs that were jury finalists from the Transformative Projects process
Note 2: Costs are not shown for 4 public agency projects and the 12 jury finalists, since modelling and/or cost review are in progress
(see high-level description of methodology at the bottom of the page)

Lifecycle costs in billions of 2019 dollars discounted present value; Project costs in billions of 2019 dollars

						Lifecycle Costs (billions of discounted present value 2019 dollars)				Project Costs (2019$B) (as reviewed with sponsor)	
Project Type	Project ID	Row ID	Project	Project Source	Total Lifecycle Cost (billions of discounted present value 2019$)	Initial Capital Cost	O&M	Rehab + Replacement	Residual Value	Initial Capital Cost	Annual O&M
Build Core Rail	1002	1	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 3: Mission St)	Crossings Study	$36.2B	$33.8B	$4.8B	$2.6B	($5.0B)	$39.6B	$0.3B
	1003	2	New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 4: New Markets)	Crossings Study	$37.4B	$34.9B	$4.9B	$2.7B	($5.1B)	$40.9B	$0.3B
	1004	3	New San Francisco-Oakland Transbay Rail Crossing - Commuter Rail (Crossing 5)	Crossings Study	$46.1B	$39.2B	$7.4B	$4.2B	($4.7B)	$45.9B	$0.4B
	1007	4	New San Francisco-Oakland Transbay Rail Crossing - BART + Commuter Rail (Crossing 7)	Crossings Study	$83.5B	$74.1B	$12.4B	$6.9B	($9.8B)	$86.8B	$0.7B
	2205	5	BART to Silicon Valley (Phase 2)	VTA	$6.0B	$4.7B	$1.3B	$0.5B	($0.5B)	$5.2B	$0.1B
	2208	6	BART Gap Closure (Millbrae to Silicon Valley)	VTA	$40.4B	$43.2B	$1.1B	$2.2B	($6.0B)	$50.7B	$0.1B
	2300	7	Caltrain Downtown Extension	TJPA	$4.8B	$4.4B	$0.7B	$0.1B	($0.5B)	$4.9B	$0.0B
	2306	8	Dumbarton Rail (Redwood City to Union City)	SamTrans + CCAG	$3.9B	$2.7B	$1.1B	$0.4B	($0.3B)	$3.0B	$0.1B
	2310	9	Megaregional Rail Network + Resilience Project (Caltrain, ACE, Valley Link, Dumbarton, Cap Cor)	City of San Jose	$54.1B	$47.0B	$9.9B	$2.4B	($5.1B)	$55.9B	$0.6B
Extend Rail Network - High Cost	2203	10	BART to Hercules & I-80 Bus from Vallejo to Oakland	CCTA	$5.8B	$4.1B	$0.5B	$1.5B	($0.3B)	$4.5B	$0.0B
	2204	11	BART on I-680 (Walnut Creek to West Dublin/Pleasanton)	Caltrans	$11.0B	$9.4B	$0.9B	$1.4B	($0.7B)	$10.2B	$0.0B
	2206	12	BART Extension from Diridon to Cupertino	VTA	$12.1B	$11.1B	$1.5B	$0.9B	($1.5B)	$13.0B	$0.1B
	2207	13	BART Extension from Diridon to Gilroy (replacing existing Caltrain)	VTA	$17.7B	$14.2B	$2.9B	$2.3B	($1.7B)	$16.6B	$0.2B
	2308	14	Valley Link (Dublin to San Joaquin Valley)	TVSJVRRA	$3.0B	$2.0B	$0.7B	$0.5B	($0.2B)	$2.2B	$0.0B
Extend Rail Network - Low Cost	2202	15	BART DMU Extension to Brentwood	CCTA	$0.6B	$0.4B	$0.1B	$0.1B	$0.0B	$0.4B	$0.0B
	2304	16	SMART Extension to Cloverdale	SMART	$0.5B	$0.3B	$0.1B	$0.1B	$0.0B	$0.4B	$0.0B
	2305	17	SMART to Solano (Novato to Suisun City, without sea level rise protections)	SMART	$1.6B	$1.1B	$0.2B	$0.4B	($0.1B)	$1.2B	$0.0B
Optimize Existing Transit Network - High Cost	2001	18	AC Transit Local Rapid Network: Capital Improvements + Service Increase	AC Transit	$8.4B	$2.5B	$4.5B	$1.6B	($0.1B)	$2.6B	$0.2B
	2005	19	Alameda County BRT Network + Connected Vehicle Corridors	ACTC	$4.0B	$1.1B	$2.2B	$0.7B	($0.1B)	$1.2B	$0.1B
	2201	20	BART Core Capacity	BART	$4.5B	$2.8B	$1.2B	$0.8B	($0.4B)	$3.2B	$0.1B
	2301	21	Caltrain Full Electrification and Blended System: Base Growth	Caltrain + HSR	$20.9B	$19.0B	$3.4B	$0.5B	($2.1B)	$22.6B	$0.2B
	2302	22	Caltrain Full Electrification and Blended System: Moderate Growth	Caltrain + HSR	$24.6B	$21.8B	$4.4B	$0.8B	($2.3B)	$25.9B	$0.2B
	2303	23	Caltrain Full Electrification and Blended System: High Growth	VTA, City of San Jose	$36.9B	$29.3B	$8.2B	$1.6B	($2.1B)	$30.6B	$0.3B
	2401	24	North San Jose LRT Subway	VTA	$4.9B	$5.3B	$0.1B	$0.1B	($0.7B)	$5.8B	$0.0B
	2407	25	Muni Metro Southwest M-Line Subway	SFCTA	$5.6B	$3.7B	$2.2B	$0.2B	($0.5B)	$4.1B	$0.1B
	2409	26	VTA LRT Systemwide Grade Separation	VTA	$11.6B	$12.2B	$0.2B	$0.7B	($1.5B)	$14.2B	$0.0B
	2410	27	VTA LRT Systemwide Grade Separation and Full Automation	City of San Jose	$14.8B	$15.4B	$0.2B	$0.8B	($1.6B)	$17.3B	$0.0B
	2411	28	VTA LRT Systemwide Grade Separation, Network Expansion, and Full Automation	City of San Jose and VTA	$44.2B	$44.1B	$2.1B	$2.9B	($4.9B)	$49.6B	$0.1B
Optimize Existing Transit Network - Low Cost	2000	29	AC Transit Local Network: Service Increase	AC Transit	$2.6B	$0.2B	$2.2B	$0.2B	$0.0B	$0.2B	$0.1B
	2003	30	Muni Forward: Capital Improvements + Service Increase	SF	$2.9B	$0.4B	$2.1B	$0.4B	$0.0B	$0.5B	$0.1B
	2004	31	Sonoma Countywide Bus: Service Increase	SCTA	$0.9B	$0.3B	$0.4B	$0.3B	$0.0B	$0.3B	$0.0B
	2007	32	San Francisco Southeast Waterfront Transit Improvements	SF	$0.6B	$0.2B	$0.3B	$0.1B	$0.0B	$0.2B	$0.0B
	2008	33	Alameda Point Transit Network Improvements	ACTC	$0.5B	$0.1B	$0.4B	$0.0B	$0.0B	$0.1B	$0.0B
	2100	34	San Pablo BRT	AC Transit	$0.5B	$0.3B	$0.0B	$0.2B	$0.0B	$0.3B	$0.0B
	2101	35	Geary BRT (Phase 2)	SF	$0.6B	$0.2B	$0.3B	$0.2B	$0.0B	$0.2B	$0.0B

Lifecycle Costs (calculated using discounted present value methodology):
Initial Capital Cost: Capital cost of constructing/implementing the project
O&M: Annual operating and maintenance costs of the project over the full analysis period
Rehab + Replacement: Rehabiliation costs of pavement and roadway structures; replacement costs of roadway and transit assets after their useful lives (e.g. bus replacement every 14 years, roadway technology every 20 years)
Residual Value: Represents useful value of assets/infrastucture at the end of the analysis period (based on straight line depreciation)
Project Costs (as reviewed with sponsor):
Reflects sponsor submitted costs of projects. These were revised in some cases when a high-level cost review of all projects using an independent cost consultant and a uniform methodology flagged sponsor costs that may have been underestimated (such cases were discussed with the sponsors individually).
(The full methodology can be found on our website)

Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment E: Detailed Table of Lifecycle Costs

Note 1: Total number of projects: 93; 81 projects from public agencies, 12 projects from public/NGOs that were jury finalists from the Transformative Projects process
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Lifecycle costs in billions of 2019 dollars discounted present value; Project costs in billions of 2019 dollars

						Lifecycle Costs (billions of discounted present value 2019 dollars)				Project Costs (2019$B) (as reviewed with sponsor)	
Project Type	Project ID	Row ID	Project	Project Source	Total Lifecycle Cost (billions of discounted present value 2019$)	Initial Capital Cost	O&M	Rehab + Replacement	Residual Value	Initial Capital Cost	Annual O&M
Optimize Existing Transit Network - Low Cost	2103	36	SamTrans El Camino Real BRT: Capital and Service Improvements	CCAG	$0.4B	$0.2B	$0.0B	$0.1B	$0.0B	$0.2B	$0.0B
	2105	37	Alameda County E14th St/Mission and Fremont Blvd Multimodal Corridor	ACTC	$0.5B	$0.3B	$0.0B	$0.2B	$0.0B	$0.3B	$0.0B
	2209	38	Irvington BART Infill Station	ACTC	$0.2B	$0.1B	$0.1B	$0.0B	$0.0B	$0.1B	$0.0B
	2400	39	Downtown San Jose LRT Subway	VTA	$1.9B	$2.2B	($0.1B)	$0.1B	($0.3B)	$2.4B	$0.0B
	3001	40	Treasure Island Congestion Pricing	SF	$0.8B	$0.1B	$0.6B	$0.1B	$0.0B	$0.1B	$0.0B
	3002	41	Downtown San Francisco Congestion Pricing	SF	$0.3B	$0.0B	$0.3B	$0.0B	$0.0B	$0.1B	$0.0B
Build Local Transit	2402	42	San Jose Airport People Mover	VTA	$1.4B	$1.1B	$0.2B	$0.2B	($0.1B)	$1.2B	$0.0B
	2403	43	Vasona LRT Extension (Phase 2)	VTA	$0.3B	$0.2B	$0.0B	$0.0B	$0.0B	$0.2B	$0.0B
	2408	44	Muni Metro T-Third Extension to South San Francisco	City of South San Francisco	$1.8B	$1.1B	$0.4B	$0.3B	($0.1B)	$1.2B	$0.0B
	2412	45	SR-85 LRT (Mountain View to US101 interchange)	City of Cupertino	$3.7B	$2.6B	$0.5B	$0.8B	($0.2B)	$2.9B	$0.0B
	4000	46	Oakland/Alameda Gondola Network	City of Oakland	$1.1B	$0.7B	$0.2B	$0.3B	$0.0B	$0.7B	$0.0B
	4001	47	Mountain View AV Network (Free Fare, Subsidies from Companies)	City of Mountain View	$1.4B	$1.3B	$0.2B	$0.0B	($0.1B)	$1.4B	$0.0B
	4002	48	Contra Costa Autonomous Shuttle Program	CCTA	$3.4B	$1.3B	$0.9B	$1.2B	($0.1B)	$1.4B	$0.0B
	4003	49	Cupertino-Mountain View-San Jose Elevated Maglev Rail Loop	City of Cupertino	$8.1B	$7.2B	$0.3B	$1.1B	($0.6B)	$7.9B	$0.0B
	5003	50	I-680 Corridor Improvements (BRT, Express Bus, Shared AVs, Gondolas)	CCTA	$4.6B	$1.3B	$2.6B	$0.8B	($0.1B)	$1.4B	$0.1B
Enhance Alternate Modes	2600	51	WETA Ferry Service Frequency Increase	WETA	$0.4B	$0.0B	$0.3B	$0.0B	$0.0B	$0.0B	$0.0B
	2601	52	WETA Ferry Network Expansion (Berkeley, Alameda Pt, Redwood City, Mission Bay, Treasure Isla..	WETA	$1.0B	$0.3B	$0.7B	$0.0B	$0.0B	$0.3B	$0.0B
	2700	53	Bay Bridge West Span Bike Path	MTC/ABAG	$0.8B	$0.5B	$0.1B	$0.3B	$0.0B	$0.5B	$0.0B
	6006	54	Enhanced Regionwide Bike Infrastructure	MTC/ABAG	$12.6B	$7.4B	$0.8B	$4.8B	($0.4B)	$8.3B	$0.0B
Build Road Capacity - High Cost	1001	55	Southern Crossing Bridge + New San Francisco-Oakland Transbay Rail Crossing - BART (Crossing 6)	Crossings Study	$47.1B	$45.0B	$5.7B	$3.0B	($6.5B)	$52.7B	$0.3B
	1005	56	Mid-Bay Bridge (I-238 to I-380) (Crossing 2)	Crossings Study	$19.9B	$14.8B	$0.8B	$5.6B	($1.3B)	$17.4B	$0.0B
	1006	57	San Mateo Bridge Reconstruction and Widening (Crossing 1)	Crossings Study	$15.7B	$11.4B	$0.6B	$4.6B	($1.0B)	$13.4B	$0.0B
	3000	58	Regional Express Lanes (MTC + VTA + ACTC + US-101)	MTC/ABAG	$12.1B	$5.6B	$3.7B	$3.1B	($0.2B)	$6.1B	$0.2B
Build Road Capacity - Low Cost	3100	59	SR-239 Widening (Brentwood to Tracy including airport connector)	CCTA	$2.4B	$1.8B	$0.0B	$0.7B	($0.1B)	$2.1B	$0.0B
	3101	60	I-680/SR-4 Interchange Improvements (Direct/HOV Connectors, Ramp Widening, Auxiliary Lanes)	CCTA	$0.4B	$0.3B	$0.0B	$0.1B	$0.0B	$0.3B	$0.0B
	3102	61	SR-4 Operational Improvements	CCTA	$0.5B	$0.3B	$0.0B	$0.2B	$0.0B	$0.4B	$0.0B
	3103	62	SR-4 Widening (Brentwood to Discovery Bay)	CCTA	$0.4B	$0.3B	$0.0B	$0.2B	$0.0B	$0.3B	$0.0B
	3104	63	I-80/I-680/SR-12 Interchange + Widening (Phases 2B-7)	STA	$0.7B	$0.5B	$0.0B	$0.3B	$0.0B	$0.5B	$0.0B
	3105	64	SR-12 Widening (I-80 to Rio Vista)	STA	$2.5B	$1.7B	$0.1B	$0.9B	($0.1B)	$1.8B	$0.0B
	3106	65	SR-152 Realignment and Tolling	VTA	$1.9B	$1.2B	$0.1B	$0.7B	($0.1B)	$1.2B	$0.0B
	3109	66	SR-262 Widening and Interchange Improvements	ACTC	$1.0B	$0.7B	$0.0B	$0.4B	$0.0B	$0.7B	$0.0B
	3110	67	Union City-Fremont East-West Connector	ACTC	$0.4B	$0.3B	$0.0B	$0.1B	$0.0B	$0.3B	$0.0B
Optimize Existing Freeway Network	2002	68	AC Transit Transbay Network: Capital Improvements + Service Increase	AC Transit	$6.5B	$2.2B	$2.8B	$1.6B	($0.2B)	$2.4B	$0.1B
	3003	69	San Francisco Arterial HOV and Freeway HOT Lanes	SF	$1.3B	$0.7B	$0.1B	$0.5B	($0.1B)	$0.8B	$0.0B
	5000	70	Bay Area Forward (Phase 1: Freeway Ramp and Arterial Components Only)	MTC/ABAG	$0.6B	$0.3B	$0.1B	$0.2B	$0.0B	$0.3B	$0.0B

Lifecycle Costs (calculated using discounted present value methodology):
Initial Capital Cost: Capital cost of constructing/implementing the project
O&M: Annual operating and maintenance costs of the project over the full analysis period
Rehab + Replacement: Rehabiliation costs of pavement and roadway structures; replacement costs of roadway and transit assets after their useful lives (e.g. bus replacement every 14 years, roadway technology every 20 years)
Residual Value: Represents useful value of assets/infrastucture at the end of the analysis period (based on straight line depreciation)
Project Costs (as reviewed with sponsor):
Reflects sponsor submitted costs of projects. These were revised in some cases when a high-level cost review of all projects using an independent cost consultant and a uniform methodology flagged sponsor costs that may have been underestimated (such cases were discussed with the sponsors individually).
(The full methodology can be found on our website)

Horizon/Plan Bay Area 2050: Draft Project Performance Findings
Attachment E: Detailed Table of Lifecycle Costs

Note 1: Total number of projects: 93; 81 projects from public agencies, 12 projects from public/NGOs that were jury finalists from the Transformative Projects process
Note 2: Costs are not shown for 4 public agency projects and the 12 jury finalists, since modelling and/or cost review are in progress
(see high-level description of methodology at the bottom of the page)

Lifecycle costs in billions of 2019 dollars discounted present value; Project costs in billions of 2019 dollars

						Lifecycle Costs (billions of discounted present value 2019 dollars)				**Project Costs (2019$B) (as reviewed with sponsor)**	
Project Type	Project ID	Row ID	Project	Project Source	Total Lifecycle Cost (billions of discounted present value 2019$)	Initial Capital Cost	O&M	Rehab + Replacement	Residual Value	Initial Capital Cost	Annual O&M
Resilience	3200	71	SR-37 Long Term Project (Tolling, Elevation, Interchanges, Widening, Express Bus)	MTC/ABAG/North Bay Count..	$5.4B	$3.7B	$0.3B	$1.7B	($0.3B)	$4.1B	$0.0B
	7001	72	VTA LRT Resilience Project (Tasman West)	MTC/ABAG/BCDC	$0.2B	$0.1B	$0.0B	$0.1B	$0.0B	$0.1B	$0.0B
	7002	73	I-580/US-101/SMART Marin Resilience Project	MTC/ABAG/BCDC	$0.2B	$0.1B	$0.0B	$0.1B	$0.0B	$0.1B	$0.0B
	7003	74	US-101 Peninsula Resilience Project (San Antonio Rd, Poplar Ave, Millbrae Ave)	MTC/ABAG/BCDC	$0.2B	$0.1B	$0.0B	$0.1B	$0.0B	$0.1B	$0.0B
	7004	75	SR-84 Resilience Project (Dumbarton Bridge, 101 interchange)	MTC/ABAG/BCDC	$0.2B	$0.1B	$0.0B	$0.0B	$0.0B	$0.1B	$0.0B
	7005	76	SR-237 Resilience Project (Alviso)	MTC/ABAG/BCDC	$0.2B	$0.1B	$0.0B	$0.1B	$0.0B	$0.1B	$0.0B
	7006	77	I-880 Resilience Project (South Fremont)	MTC/ABAG/BCDC	$0.1B	$0.0B	$0.0B	$0.0B	$0.0B	$0.0B	$0.0B

Lifecycle Costs (calculated using discounted present value methodology):
Initial Capital Cost: Capital cost of constructing/implementing the project
O&M: Annual operating and maintenance costs of the project over the full analysis period
Rehab + Replacement: Rehabiliation costs of pavement and roadway structures; replacement costs of roadway and transit assets after their useful lives (e.g. bus replacement every 14 years, roadway technology every 20 years)
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(The full methodology can be found on our website)

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Horizon/Plan Bay Area 2050:

Draft Project Performance Findings

Anup Tapase, MTC/ABAG

November 2019

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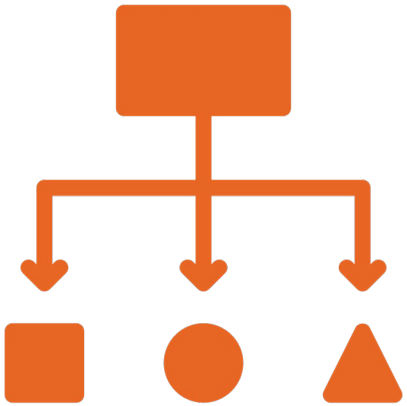
The Project Performance Assessment is **one key lens to understand how our major transportation investments would fare in an uncertain future**, in combination with Futures Planning which explored synergies between individual projects and strategies.

Key Objectives of Project Performance

- Understand how project benefits vary under different conditions.
- Learn how the performance of projects could be enhanced.
- Start a collaborative dialogue with all stakeholders.

Process to Date



Requested projects for consideration in Plan Bay Area 2050

Spring 2018 to Spring 2019

Develop evaluation methodology with input from RAWG/RMWG

Summer 2018 to Winter 2019

Evaluated benefits & costs of 93 projects using three Futures

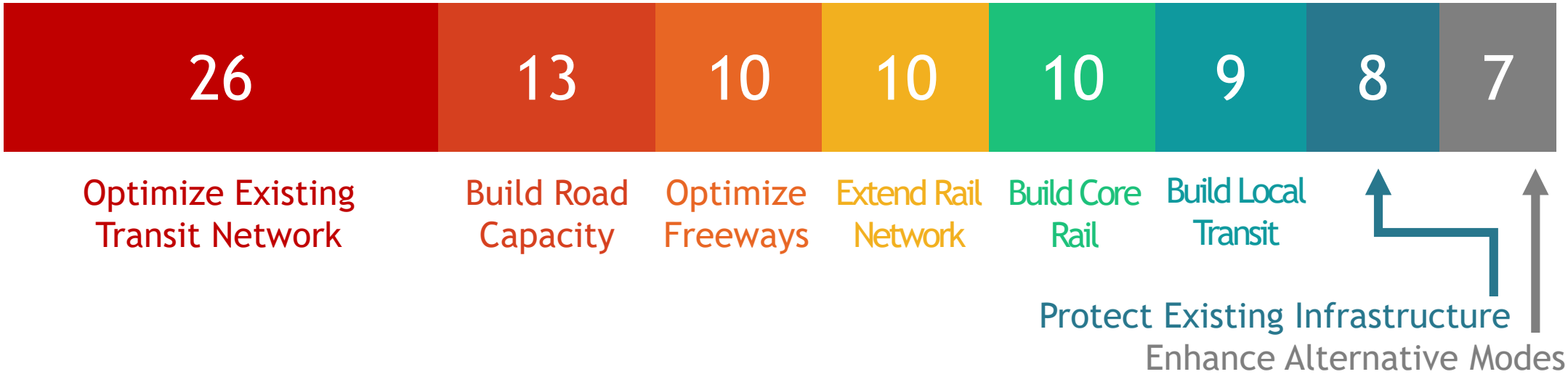
Spring 2019 to Fall 2019

Identify findings/next steps to prioritize projects & strategies

Fall 2019 & beyond

Which Projects Did We Evaluate?

Number of Projects by Objective



Capital Cost Breakdown of Projects*

86% of capital costs are for rail investments

3% of capital costs are for bus investments

7% of capital costs are for road investments

* **Does not include public submissions of transformative projects selected by the jury**; costs for these projects are still under development.

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Which Projects Did We Not Evaluate?

Committed Projects
(not exhaustive list; included in baseline network for analysis)

- **BART:** Silicon Valley Phase 1; Fleet Modernization
- **Caltrain:** Modernization
- **Muni:** Central Subway; Muni Forward; Van Ness BRT; Geary BRT Phase 1
- **SMART:** Larkspur and Windsor Extensions
- **VTA:** Eastridge Extension; Next Network
- **AC Transit:** International Blvd BRT; AC Go
- **Express Lanes:** Committed Segments Only
- **Interchanges:** I-680/SR-4 (initial phases); I-80/I-680/SR-12 (initial phases)

Projects Less than $250 Million or Not Capacity-Increasing
(exempt from Project Performance)

How Were Projects Evaluated?

Benefit-Cost Assessment *(x 3 Futures)*: **is the project cost-effective & resilient?**

If benefit-cost ratio in a given Future is greater than 1, then benefits exceed costs.

- List of benefits and costs provided on following slide

Equity Assessment *(x 3 Futures)*: **is the project advancing equity?**

If greater than 60% of project access benefits benefit lower-income households, then it advances equity.

- Quantitative assessment: reflected in equity score
- Geographic assessment: showcased as secondary legacy assessment *(similar to Plan Bay Area 2040)*

Guiding Principles Assessment: is the project aligned with Plan Bay Area 2050's vision?

If no Guiding Principles "flags" are identified, then it is generally aligned with the Guiding Principles.

- Qualitative assessment based on the five Guiding Principles:
  - Affordable, Connected, Diverse, Healthy, Vibrant

How Were Projects Evaluated: *Benefit-Cost*

Benefits

Accessibility Benefits

- Travel time - in vehicle
- Travel time - out of vehicle
- Vehicle operating costs
- Travel costs
- Mode choice availability

- **Freeway Reliability + Vehicle Ownership**
- Transit Crowding
- **Environmental** (Emissions; Natural Land Loss)
- **Health** (Physical Activity; Air Pollutants; Noise)
- **Safety** (Collisions/Injuries; on-model & off-model/ operational benefits)

Costs

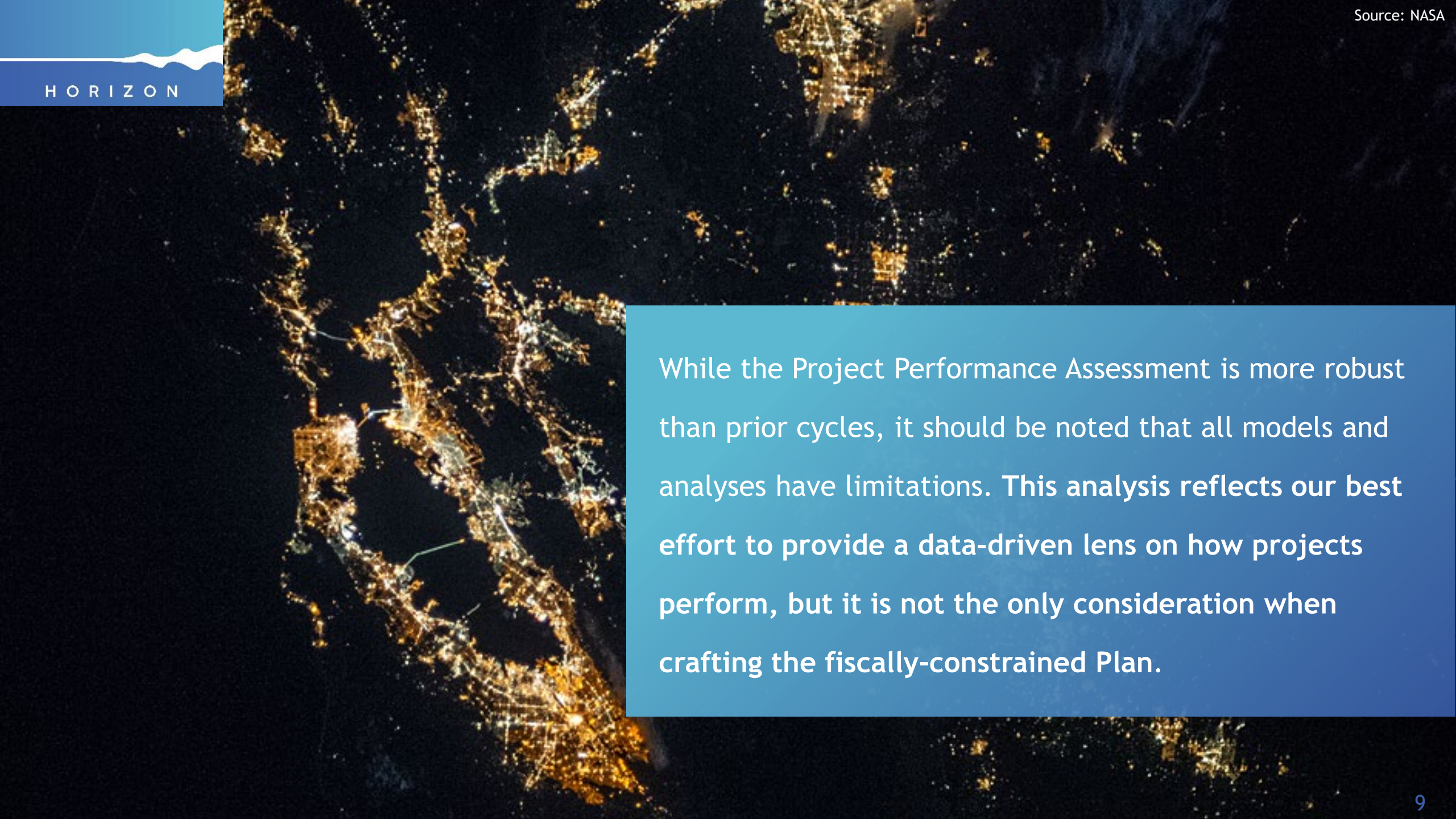
Capital Costs

- Initial investment
- Rehab/Replacement Costs
- Residual value

Operating & Maintenance Costs (annual)

Benefit-Cost Ratio = $\frac{\text{Benefits}}{\text{Costs}}$

Major Enhancements from Plan Bay Area 2040



Source: NASA

While the Project Performance Assessment is more robust than prior cycles, it should be noted that all models and analyses have limitations. **This analysis reflects our best effort to provide a data-driven lens on how projects perform, but it is not the only consideration when crafting the fiscally-constrained Plan.**

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DRAFT

Key Findings & Next Steps

Integrating Performance Findings into
Plan Bay Area 2050's Transportation Element

KEY FINDING

1

Costs of projects evaluated totaled more than $400 billion, well exceeding the fiscal constraints of the Bay Area.

Not only have existing megaprojects grown in costs, but bold new ideas are increasingly expensive. Plan Bay Area 2050 should recommend regional reforms to speed project delivery and manage capital and O&M costs.

KEY FINDING

2

Project performance will be significantly affected by uncertain future conditions.

Projects should be planned along with complementary strategies that enhance their performance and resilience, such as enhanced land use strategies near new stations or pricing strategies to boost demand.

KEY FINDING

3

Lower-cost transit improvements, such as urban BRT lines, and sea level rise protections for heavily-used freeways are the best bet in an uncertain future.

Such projects should be seen as low-hanging fruit and advanced to implementation expeditiously.

KEY FINDING

4

High-cost commuter rail projects have mixed performance outcomes, predominantly benefiting higher-income groups.

Rail projects should be evaluated alongside lower-cost bus improvements. Such projects should be paired with complementary strategies to ensure that all Bay Area residents benefit from them.

KEY FINDING

5

Some projects have synergies, while other projects compete with each other.

In a fiscally-constrained environment, we should focus on complementary investments and strategies, while being careful before including projects that degrade benefits of others.

KEY FINDING

6

Pricing is the most powerful tool to affect traffic congestion and travel patterns - but it must be done in an equitable manner.

Rather than adding highway capacity, Plan Bay Area 2050 should integrate pricing strategies - but only if meaningful toll discounts or other mitigations are integrated for those of lesser means.

Early Finding
Full assessment still in progress

KEY FINDING 7

Transit fare reforms could meaningfully change travel behavior.

Reforming the Bay Area's complex fare systems could significantly grow ridership. However, this strategy must be paired with service and capacity increases to accommodate the robust growth in demand.

KEY FINDING

8

Greater investment in micromobility can have significant regional benefits for the overall transportation network.

The region should consider including a much more significant investment in active transportation than prior iterations of Plan Bay Area.

KEY FINDING

9

A new Transbay Rail Crossing emerged as the most cost-effective transit expansion megaproject.

To relieve crowding, support focused growth, and enhance mobility across the Bay Area, Plan Bay Area 2050 should consider a new rail and/or BART crossing between San Francisco and the East Bay as a critical new investment.

Findings on Select Corridors

- **Peninsula/US-101.** The region should carefully consider the sequencing of investments on this corridor, especially given a potential nexus with a New Transbay Rail Crossing.
- **Altamont Pass.** Rather than adding auto capacity, combining Valley Link with complementary pricing strategies presents a promising path forward.
- **South Bay.** Some of the aspirational transit improvements in Santa Clara County fell short on cost-effectiveness in most Futures, but there may be land use benefits of such projects that cannot be fully reflected.
- **SR-4/SR-239.** Operational improvements yield meaningful benefits to travelers along this freeway corridor, but expansions are less resilient in an uncertain future.
- **SR-37.** For this east-west connection, the proposed resilience project had higher costs and lower benefits than other transportation facilities requiring protection from rising sea levels.

Snippet from Attachment A: Summary Table of Projects

	Benefit-Cost Ratio			Equity Score		
Guiding Principle Flags	Rising Tides Falling Fortunes	Clean And Green	Back To The Future	Rising Tides Falling Fortunes	Clean And Green	Back To The Future
2	0.7	2	2	Even	Even	Even
2	0.6	1	1	Even	Even	Even
0	0.6	1	1	Even	Even	Even
0	0.6	1	1	Even	Even	Even
0	<0.5	0.7	0.6	Challenges	Challenges	Challenges
2	<0.5	0.6	0.5	Challenges	Challenges	Challenges
0	<0.5	<0.5	0.6	Advances	Advances	Even
0	<0.5	<0.5	0.5	Even	Even	Challenges
0	<0.5	<0.5	<0.5	Advances	Advances	Even
0	cost review in progress			cost review in progress		
0	<0.5	1	1	Even	Even	Even
0	<0.5	<0.5	<0.5	Even	Advances	Even
0	<0.5	<0.5	<0.5	Challenges	Challenges	Challenges
1	<0.5	<0.5	<0.5	Even	Advances	Even
0	<0.5	<0.5	<0.5	Even	Even	Even
0	modeling in progress			modeling in progress		
0	modeling in progress			modeling in progress		
0	<0.5	<0.5	<0.5	Even	Challenges	Challenges
0	<0.5	0.5	<0.5	Advances	Challenges	Challenges
0	<0.5	<0.5	<0.5	Challenges	Even	Challenges
0	1	2	2	Even	Even	Even
2	<0.5	1	0.5	Challenges	Even	Challenges
2	<0.5	0.9	0.5	Challenges	Even	Challenges
0	<0.5	0.5	0.6	Advances	Advances	Even
1	<0.5	<0.5	0.7	Advances	Advances	Even
0	<0.5	<0.5	<0.5	Advances	Advances	Challenges
0	<0.5	<0.5	0.5	Advances	Advances	Even
0	<0.5	<0.5	<0.5	Advances	Advances	Even
2	<0.5	<0.5	<0.5	Even	Even	Even
0	<0.5	<0.5	0.5	Even	Advances	Even
1	8	7	>10	Challenges	Challenges	Challenges
0	1	1	9	Even	Even	Even
1	2	3	4	Challenges	Challenges	Challenges

Moving Forward

- **During Plan Bay Area and Plan Bay Area 2040,** MTC has used the Project Performance Assessment to categorize projects as high-, medium- and low-performing - with low-performing projects required to submit a "compelling case" if they wished to include it in the fiscally-constrained Plan.
- **For Plan Bay Area 2050, we are proposing a solutions-oriented approach instead.** This would continue the identification of high-performing projects, but for all remaining projects, MTC would work collaboratively with sponsors to identify project refinements or complementary local or regional strategies to address performance shortcomings.

Moving Forward

LATE JANUARY

Commission & Board Workshop:
Plan Bay Area 2050 Draft Blueprint
Transportation Tradeoffs Discussion

November

- Finish analysis of remaining projects
- Continue to address questions raised by project sponsors
- Start conversation on "high-performing" project definition

December

- Refine definition of "high-performing" project
- Begin conversations with project sponsors on refinements & complementary strategies

January

- Incorporate high-performing projects into Transportation component of Draft Blueprint
- Continue conversations with project sponsors on remaining projects

HORIZON

Questions?

Thank you to our transportation partners from across the Bay Area for their continued collaboration - as we work together to make our major investments even better in the coming months.

375 Beale Street, Suite 800
San Francisco, CA 94105

Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1196	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience (30 minutes) Overview of the draft financial needs associated with transportation, affordable housing, and resilience for Plan Bay Area 2050, the next-generation regional plan.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	07_PBA 2050-Draft Needs Assessments for Transportation, Housing and Resilience.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience (30 minutes)

Overview of the draft financial needs associated with transportation, affordable housing, and resilience for Plan Bay Area 2050, the next-generation regional plan.

Presenter:
William Bacon, Dave Vautin, and Rachael Hartofelis

Recommended Action:
Information

Attachments: List any attachments.

Metropolitan Transportation Commission

Policy Advisory Council

November 13, 2019 **Agenda Item 7**

Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience

Subject: Overview of the draft financial needs associated with transportation, affordable housing, and resilience for Plan Bay Area 2050, the next-generation regional plan.

Background: Policy Advisory Council Agenda Item 7, Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience is attached. This report will be presented to the Regional Advisory Working Group on November 5, 2019.

Staff will be at your November 13 meeting to discuss this report. The Council's input is requested.

Attachments: Agenda Item 3 from the November 5, 2019 Regional Advisory Working Group

Metropolitan Transportation Commission and the Association of Bay Area Governments

Regional Advisory Working Group

November 5, 2019 **Agenda Item 3**

Plan Bay Area 2050: Draft Needs Assessments for Transportation, Housing and Resilience

Subject: Overview of the draft financial needs associated with transportation, affordable housing, and resilience for Plan Bay Area 2050, the next-generation regional plan.

Background: As MTC and ABAG work to develop a more comprehensive regional plan, it is important to consider the financial needs and revenues for a broader array of issue areas. Building upon the successful work from prior iterations of Plan Bay Area, Plan Bay Area 2050 will include needs and revenue estimates for the traditional suite of transportation operations and maintenance (O&M), as well as equally critical needs for affordable housing and resilience.

Needs and revenue assessments have proven valuable in prior cycles of Plan Bay Area as they have identified what it would take to fully fund fundamental issue areas like roadway maintenance, as well as the reasonably anticipated funding that could fill those gaps. Staff continue to work on the revenue assessments for each of the topic areas; draft revenue estimates, both with and without new revenues under consideration, are expected to be available in draft form in December.

Draft assessments of needs for each topic area – between 2021 and 2050 – were completed over the summer; staff are currently seeking feedback on this work as we begin work on the Draft Blueprint for Plan Bay Area 2050. Additional information on each assessment can be found in the attachments to this memo. Findings of the draft needs assessments are also summarized below, with all costs shown in year-of-expenditure (YOE) dollars for state of good repair:

- **Transportation:**
  - Public Transit O&M: $302 billion in needs
  - Roads, bicycle/pedestrian infrastructure*, Bridges, and Highways O&M: $115 billion in needs
- **Affordable Housing:** $473 billion in needs
- **Resilience:**
  - Sea Level Rise: $15 billion in needs
  - Earthquake: $17 billion in needs *(for residential units only)*

Next Steps: Staff will continue to work with stakeholders and technical experts on each of the needs and revenue assessments over the coming months. It is anticipated that the needs and revenue estimates will be finalized in early 2020 in time to begin analysis of the Draft Blueprint for Plan Bay Area 2050.

Attachments: Attachment A: Draft Transportation Needs Assessments
Attachment B: Draft Affordable Housing Needs Assessment
Attachment C: Draft Resilience Needs Assessments
Attachment D: Presentation

* Includes on-pavement but not dedicated off system bicycle or pedestrian paths.

Draft Transportation Needs Assessments

Plan Bay Area 2050, the next-generation plan for transportation, housing, the economy, and the environment, will span 30 years from fiscal years 2021 through 2050. Plan Bay Area 2050 must meet or exceed federal and state requirements, including RTP/SCS requirements related to fiscal constraint. This requires the estimation of costs and available revenues for the operation and preservation (capital maintenance) of the existing transportation system. The information presented below is a preliminary draft estimate of the region's transportation operations and preservation needs over the lifespan of the Plan. This information is being provided for your review in advance of being presented to the MTC/ABAG boards in December.

For the Local Streets and Roads and Transit Capital categories, the system preservation needs were calculated for two different "condition level" scenarios:

1. **Maintain Existing Conditions**
    - Local jurisdictions maintain the existing pavement condition index (PCI) and deferred maintenance costs are held relatively stable but continue to grow at the rate of inflation
    - Transit operators maintain the existing percentage of capital assets over useful life (PAOUL). In this scenario, the total backlog dollar maintains the present-day replacement cost value of all assets beyond their useful life, adjusting for inflation.

2. **State of Good Repair (SGR)**
    - Pavement conditions reach a "best management practices" level within the first ten years of the analysis period, and then maintain that level for the duration of the Plan period. A best management practices condition level equates roughly to a low-to-mid 80s pavement condition index (PCI). Deferred maintenance is eliminated.
    - All transit capital assets are replaced and rehabilitated within the first ten years of the analysis period--to 0% percent of assets over useful life (PAOUL)-- and then maintained at that level for the duration of the Plan period. In this scenario, all assets are replaced when they reach the end of their useful lives and existing assets that are in marginal or poor condition (TERM Lite Score 2 or 1) are replaced in the first decade.

Only one condition level scenario was calculated for local bridges, state highways, and regional bridge capital maintenance and operations due to limited data availability and/or modeling capability. For transit operations, the only scenario calculated was the cost to maintain existing service levels, since expanded service levels would be proposed as part of the Plan's project submittal process.

Table 1 below shows the total transportation operations and preservation needs calculated for Plan Bay Area 2050. Results by mode and methodologies used to estimate the needs are contained in subsequent pages of this attachment.

Table 1. Plan Bay Area 2050 Draft Transportation Operation and System Preservation Needs (in millions of $YOE)

Mode	State of Good Repair	Maintain Conditions
Local Streets, Roads, and bicycle/pedestrian infrastructure	$68,395	$61,859
State Highways[2]	$24,427	$24,427
Local Bridges[2]	$2,554	$2,554
Regional Bridges[2,3]	$19,415	$19,415
Transit Capital	$84,561	$59,385
Transit Operating[4]	$217,819	$217,819
Total	$417,171	$385,460

Notes:

1) Includes $20.5 billion in operations costs/needs.
2) Needs associated with maintaining existing condition levels is not available for the state highway system or bridges.
3) The regional bridge category does not include the Golden Gate Bridge.
4) The transit operating needs assessment only considers what is needed to maintain existing service levels, therefore the transit operating needs are the same for both State of Good Repair and Maintain Conditions.

Local Streets and Roads

As shown in Table 2 below, to maintain existing conditions on the region's 43,500 lane miles of local streets, roads, and on-system bicycle/pedestrian, and other non-pavement infrastructure, approximately $41 billion is needed over the Plan period. To reach a state of good repair, with a corresponding condition level for non-pavement assets (signs, signals, sidewalks, storm drains, etc.), an investment of $48 billion is needed over the next 30 years. These costs do not include the estimated $20.5 billion in operations cost and overhead that will be needed to perform routine maintenance, pothole filling, street sweeping, and other requirements that keep local streets and roads serviceable.

For comparison, on *an annualized basis* (as each iteration of Plan Bay Area has a different number of years included within the planning horizon), the draft Plan Bay Area 2050 preservation needs for local streets and roads are approximately six percent higher than those estimated for Plan Bay Area 2040 (the current Plan). The increase in maintenance need is largely due to higher costs for maintenance materials and contract labor resulting from a strong economy and market competition.

Table 2. System Preservation Draft Needs for Local Streets, Roads, and bicycle/pedestrian infrastructure — By County (in millions of $YOE)

County	Maintain Conditions	State of Good Repair
Alameda	$7,940	$8,977
Contra Costa	$6,101	$6,878
Marin	$1,374	$1,676
Napa	$871	$1,290
San Francisco	$5,189	$5,759
San Mateo	$3,824	$4,220
Santa Clara	$10,186	$11,290
Solano	$2,838	$3,351
Sonoma	$3,028	$4,446
Total	$41,351	$47,886

To calculate the pavement maintenance need, MTC's pavement management software, StreetSaver® was used to determine how much funding would be needed for each jurisdiction to reach the condition level for each scenario. Average maintenance costs, a key input into the StreetSaver® model, were estimated by county, using information submitted by local jurisdictions to the 2018 California Local Street and Road Needs Assessment survey.

Non–Pavement needs include the capital maintenance of assets that are required for a functioning street and road system. Primary examples of these assets include storm drains, sidewalks, curb & gutter, streetlights, signs, and signals. To estimate the Non-Pavement needs on the local street and road system, MTC used a prediction model developed by consultants that uses information provided by local jurisdictions on non-pavement asset inventory and useful life to estimate long term costs to maintain non-pavement assets. It was determined that replacement costs can be predicted by the inventory of two non-pavement assets—curb and gutter and streetlights—using a regression formula. The total regional non-pavement asset replacement cost is then divided by the average useful life for each of the major non-pavement asset groups to estimate an annual preservation cost. The regional totals are then distributed across all jurisdictions based on a formula comprised of population share and lane mileage. The prediction model was updated with asset inventory and replacement cost information provided by local jurisdictions in responses to the 2018 California Local Street and Road Needs Assessment survey.

State Highways

The needs assessment for the state highway system relies on information provided by the California Department of Transportation in its 2019 State Highway System Management Plan (SHSMP), and analysis of the District 4 (Bay Area) pipelined projects and remaining needs for all SHOPP expense categories. Future adjustments to the state highway needs assessment may be made to account for specific Bay Area operational and maintenance needs over and above the assumed Bay Area population share of these needs as incorporated in the SHOPP forecast, and additional input that may be provided on the estimate by Caltrans staff.

The SHSMP is produced every two years and integrates the maintenance, rehabilitation, and operation of the state highway system into a single management plan that incorporates state and federal asset management requirements. The SHSMP includes a 10-year needs assessment to achieve established performance targets for the following asset classes:

- Pavement
- Bridges and Tunnels
- Drainage
- Transportation Management Systems
- Supplementary assets including – drainage pump plants, highway lighting, overhead signs, weigh in motion scales, and other facilities of various types

To estimate the 30-year state highway need for Plan Bay Area 2050, MTC staff added pipe-lined projects in the District 4 Project Book, with the SHSMP reported cost associated with meeting stated performance targets for each of the above listed asset classes within District 4 by FY 2028-29. For FYs 2030-2050, staff took the annualized need over the first 10-year period and reduced it by 75%, then escalated the annual need by 2.2% from FY 2030 through FY 2050. This shift to a lower needs level after year 10 assumes that the needs estimated in the first 10 years are to bring the state highway system to a state of good repair, after which ongoing maintenance costs would be significantly lower. This assumption and the level of reduction applied is consistent with the those made in the local street and road and transit capital maintenance needs assessments.

Local Bridges

The nearly 2,000 locally-owned bridges in the San Francisco Bay Area are essential links that help connect the state's communities, provide mobility for travelers, support efficient movement of freight, and relieve traffic congestion. The 2018 California Local Streets and Roads Needs Assessment included the cost to maintain the locally owned bridges in the state over the next ten years, by county. The assessment used the Federal Highway Administration's National Bridge Investment Analysis System (NBIAS) system to develop the projections of capital maintenance need for the state's locally-owned bridges. Though NBIAS is populated with default costs, deterioration models and other parameters, these were calibrated to regional costs and conditions in order to provide as realistic a projection as possible of the cost to maintain locally-owned bridges.

Since the 2018 California Local Streets and Roads Needs Assessment only covered 10 years of maintenance needs, MTC staff extrapolated the needs to cover the 30-year Plan period.

Regional Bridges

The estimated operations, preservation, and replacement needs for the seven regional toll bridges was forecasted using information provided by the Bay Area Toll Authority (BATA). The BATA toll bridge maintenance, repair, and rehabilitation assessment incorporates cost information for major capital projects from the Caltrans 20-year maintenance plan and forecasted inspection and maintenance costs for lesser projects to estimate the capital costs per bridge through FY 2036. For FYs 2037 through 2050, staff assumed an annual average of the previous 15 years, adjusted for inflation.

Operations needs for the regional bridges includes those estimated by Caltrans in addition to BATA expenses for the FasTrak Customer Service Center, the ATCAS (toll-collection IT system) banking costs, and other indirect toll collection expenses. The operations costs budgeted for FY 2020, were adjusted for inflation and extrapolated to FY 2050.

Transit Operating

In spring 2019, MTC distributed a Transit Operating Needs Assessment survey to each of the Bay Area's 25 transit operators as well as the Transbay Joint Powers Authority. The Transit Operating Needs Assessment survey gathered information from transit operators on current and planned service levels; existing and projected operating costs; and existing and projected local operating revenues over the Plan Bay Area 2050 period.

The cost to operate and maintain existing service levels was projected by the transit operators. MTC requested a cost breakdown of expenses by mode (bus, paratransit, rail, etc.) and system-wide non-operating expenses including debt service by year-of-expenditure. Transit operators also provided planned service changes associated with committed capital projects and/or fully funded future increases in service hours over the Plan Bay Area 2050 period.

Inflation assumptions were checked for reasonableness across similar expense categories. The cost impact of projected changes in service levels during the plan period was accounted for only in instances where those changes are a result of the transit operators' policy directives. The operating cost projections included in Table 3 include existing service levels and cost projections for committed expansion projects. Over Plan Bay Area 2050 period, transit operators identified approximately $218 billion in costs associated with operating the existing system and committed expansions to the system.

Transit Capital

The information presented in Table 3 is a draft estimate of the cost to maintain the Bay Area's existing transit infrastructure in a state of good repair. The Transit Capital Needs are developed based on the operator submitted information housed in MTC's Regional Transit Capital Inventory (RTCI), covering existing transit assets. Operational (routine maintenance, cleaning, overhead, etc.) or expansion costs are not included in the estimate of capital maintenance needs and revenues.

To maintain existing transit capital conditions, approximately $59.4 billion is needed, and to reach a state of good repair (0% PAOUL), an investment of approximately $84.6 billion is needed over the next 30 years for the region.

Under the SGR scenario, there is an increase of approximately $37 billion in total need as compared to the $47.6 billion from the 2016 Plan Bay Area SGR assessment included in Plan Bay Area 2040 (PBA 2040). Change between the analyses is not unexpected – agencies have had an additional three years to update and amend their data. Changes to cost, date built, and useful life have significant impacts on modeling. The increase is caused by multiple factors; the values below are rough estimates of the major causes of the increase:

- $17 billion (approx.) – due to six additional years in PBA 2050 vs PBA 2040.
- $5 to 10 billion (approx.) – new assets and new replacement cost information added to the inventory since 2016, including major new projects.
- $2 to 6 billion (approx.) – per TERM Lite calculations, the base inventory value has increased by 14% since 2016. All unit costs are escalated to the current year nominal value. $1,000 in 2016 dollars would be escalated to $1,144 for the 2020 model start year in TERM Lite. All subsequent modeling assumptions are then based on this elevated rate.

Transit capital and operating needs projections by operator are shown in Table 3 on the following page.

Table 3. Draft Transit Capital and Operating Needs Projections – By Operator (in millions of $YOE)

Operator	Transit Capital Needs – SGR	Transit Capital Needs-Maintain Current Conditions	Transit Operating Needs
AC Transit	$6,175	$4,583	$22,043
ACE	$247	$163	$2,214
BART	$31,278	$21,824	$58,043
Caltrain	$5,375	$3,943	$8,349
CCCTA County Connection	$537	$471	$1,904
Clipper	$823	$773	TBD
Delta Breeze	$25	$14	$53
Dixon	$20	$12	$66
ECCTA Tri Delta Transit	$324	$279	$1,174
FAST	$228	$165	$1,179
Golden Gate Transit	$3,497	$1,786	$3,606
LAVTA	$324	$184	$1,068
Marin Transit	$328	$250	$1,472
NVTA	$189	$146	$975
Petaluma Transit	$71	$60	$123
SamTrans	$4,462	$2,188	$11,427
Santa Rosa CityBus	$151	$124	$661
SCT	$332	$243	$843
TJPA	TBD	TBD	$2,096
SFMTA	$21,234	$16,035	$67,139
SMART	$726	$601	$2,169
SolTrans	$311	$159	$795
UCT	$87	$75	$347
Vacaville City Coach	$98	$46	$205
VTA	$6,264	$4,242	$26,669
WestCAT	$396	$164	$740
WETA	$1,058	$855	$2,460
Grand Total	$84,561	$59,385	$217,819

Note: Sum of all agency values may not equal grand total due to rounding issues.

Draft Affordable Housing Needs Assessment

This attachment provides more details on the methodology and analysis results for estimating existing needs (through 2020) and future needs (2021 to 2050) for affordable housing. This assessment is designed to help quantify the needs for deed-restricted affordable housing in the context of Plan Bay Area 2050 with a similar aim to the parallel work for transportation – to understand the full needs to reach ideal conditions and then determine associated funding gaps.

There are two components to determining housing needs for low-income households – households that earn approximately less than $45,000 per year (in today's dollars). For both components, staff has assumed, for calculation purposes, that all low-income households may need to live in deed-restricted subsidized units, especially with the rising cost of living in the San Francisco Bay Area. While many low-income households currently live in what's referred to as "naturally affordable" units, these units are provided by the private market and may become unaffordable over time. Some units will also be protected through acquisition and rehabilitation (preservation). But since the level of subsidy needed for preservation is often comparable with production, this estimate does not differentiate between the two.

The two components of estimating housing needs for low-income households are:
- Forecasted household growth, or how many new low-income households will live in the region in future years; and
- Existing shortfall, or how many existing low-income households do not live in deed-restricted subsidized units.

To do this, staff used the household growth projections by income group for the Clean and Green Future from Horizon. These household forecast numbers will be updated with the Draft and Final Growth Forecasts for Plan Bay Area 2050 when available. Clean and Green was merely selected as a placeholder given that it was the moderate-growth Future explored in the predecessor Horizon process (for more information on Horizon, go to: https://www.planbayarea.org/2050-plan/horizon).

Table 2 below shows the forecasted household growth by four income categories, for the Clean and Green Future in Horizon. Key takeaways from this table include:
- There are anticipated to be roughly 766,000 low-income households in year 2020.
- These will grow by around 70,000 between 2020 and 2050, or on an annualized basis, a little more than 2,300 per year.
- Per the methodology described above, the first component of housing needs is therefore 2,300 new deed-restricted subsidized units per year between 2020 and 2050.

Table 2: Household Growth Forecast by Income Category for *Clean and Green* (Horizon)

Income Ranges	2020	2025	2030	2035	2040	2045	2050
Low (Q1)	**766,400**	**800,400**	**836,000**	**895,600**	**857,900**	**844,600**	**836,600**
Moderate-Low (Q2)	672,500	683,600	693,600	715,200	686,900	675,900	667,200
Moderate-High (Q3)	654,200	701,700	746,300	756,500	868,000	960,400	1,042,800
High (Q4)	843,200	922,400	996,900	1,020,600	1,183,100	1,345,000	1,488,800
Total	*2,936,300*	*3,108,200*	*3,272,800*	*3,387,900*	*3,595,900*	*3,826,000*	*4,035,400*

While there is no good data available on the total number of deed-restricted subsidized units in the Bay Area, estimates from NPH/CHPC put the number around 100,000 units. Additional takeaways from Table 2 include:

- Of the 766,00 low-income households, 100,000 currently live in affordable units.
- The remaining 666,000 households, per the methodology described above, constitute the existing shortfall.
- On an annualized basis, this would amount to around 22,200 new units per year between 2020 and 2050.

For this analysis, the housing need for lower-income households is therefore determined to be approximately 24,500 units per year. With an inflation rate of 2.2 percent and an anticipated per-unit subsidy of $450,000 (in today's dollars) as developed in CASA, the estimated affordable housing needs would total **$473 billion** through the year 2050 (in year of expenditure dollars).

Draft Resilience Needs Assessments

As part of creating a more comprehensive regional plan, Plan Bay Area 2050 is expanding the scope of the Needs & Revenue Assessment to include challenges related to seismic safety and sea level rise adaptation. Over the next three decades, the region will have to plan and adapt the expansive shoreline to rising sea levels with uncertain flooding timeframes, in addition to continuing to address the seismic safety challenge that has always been present in our earthquake-prone region. The Resilience Needs & Revenue Assessment will provide an underlying context/framework to consider strategies.

The Bay Area is not starting from scratch in understanding the level of need for resilience challenges, nor in raising revenues to address the challenges. In the three decades since the Loma Prieta earthquake, the Bay Area has leveraged an estimated $10.7 billion[1] in local, state, and federal dollars to upgrade the region's public and private infrastructure. Over that period, 11[2] local measures directly addressed seismic risk, and another 103[3] measures built seismic readiness into capital improvement of public buildings such as schools and libraries. The region has also invested in the mitigation of its transportation infrastructure, utilizing $650 million of 1996's Prop 192 going toward the seismic mitigation of the area's state-owned toll bridges. Additionally, the region has made strides toward addressing Sea Level Rise. The ground-breaking Measure AA, passed in 2016, provides $25 million a year for the explicit protection of the Bay, integrating a slew of restoration and green mitigation initiatives. Additionally, cities have taken on their own local projects, such as Foster City's $90 million bond initiative in 2018 to protect its entire city from becoming a FEMA designated Special Flood Hazard Area. In the same year, San Francisco passed a $425 million bond to repair the Embarcadero seawall that protects its downtown.

This draft Resilience Needs & Revenue Assessment is the first time ABAG and MTC have attempted to quantify the financial gap associated with these two important topic areas. Of course, resilience is more wide-ranging than just sea level rise and earthquakes. However, these two topics were seen as the most high priority, due to the widespread vulnerability of the region to both of these risks, and their resulting community and economic impacts. The scope of this assessment focused further on the most significant needs, specifically residential seismic safety, and near-term sea level rise. As previously mentioned, the region has been mitigating the public realm – including both infrastructure, public buildings, and transportation - for years regarding earthquakes. However, residential mitigation is both critical, and critically underfunded. None of the $10.7 billion has gone toward housing in the last few decades, and only two public programs: CEA's Brace and Bolt, and FEMA's grant programs, currently address private structures. Additionally, ABAG has identified the need for housing protection as a top priority in maintaining the communities and economy within the region. Regarding Sea Level Rise, this assessment begins with only near-term coastal Sea Level Rise adaptation, in order to focus on the most immediate vulnerabilities and most significant impacts. Other forms of resilience, including wildfire, riverine flooding, extreme heat, and other hazards and climate impacts are important to consider, but have been left outside the scope of Plan Bay Area 2050. In the meantime, it is worth noting that there are additional resources to support local planning related to these other hazards through the MTC/ABAG resilience program, NGOs and the State of California. Additionally, other hazards and refinements to this methodology may be recommended as key Implementation Actions of this Plan. Future iterations of Plan Bay Area may also utilize this assessment framework to integrate the additional hazards.

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[1] Including all direct local bonds and taxes, and all seismic FEMA grants. Assumptions include 20% of state seismic bonds, proportional to the Bay's share of population, and 10% of indirect local revenues – a broad assumption made on the case study of several local initiatives.
[2] Local direct bonds and taxes focused on seismic mitigation.
[3] Indirect local bonds and indirect special taxes.

Draft Need: Seismic Needs for Residential Buildings

A major earthquake on one of the Bay Area's many faults can damage tens of thousands of homes in a matter of seconds, adding an acute housing crisis to the region's chronic one. Additionally, with a lack of historical funding for residential buildings, public infrastructure is well protected, but there is critical unmet need for housing mitigation. This significant housing vulnerability therefore makes up the Resilience Need for Earthquakes, in order to compensate for the crucial regional financial gap.

No regional data set is available that describes the structural characteristics of every building, but staff have used available building information in the region (primarily building use, year built, number of units, and number of stories) to develop high level estimates for the number of common seismically vulnerable building types. These include single-family cripple walls where an unbraced and unbolted crawl space can shift a house off its foundation, or multi-family soft stories where a weakened first floor, often with large garage openings, can pancake on the first floor. Additional assumptions, as well as a breakdown of seismic needs, can be found in Table 2.

Some cities in the region are actively requiring owners of soft-story multifamily buildings to retrofit, and the State of California is gradually expanding a grant program designed to incentivize single family homeowners with cripple walls to retrofit. Using assumptions about typical retrofit costs, combined with regional building information, the estimated cost to address these two known vulnerabilities is approximately $13.3 billion. An additional $3.3 billion was added to account for seismic retrofit of other vulnerable building types, primarily single family and multi-family buildings with fewer than 5 units built over a garage. These units suffer the same deficiency as the larger multi-family soft story challenge, and their inclusion leads to a total estimated need of approximately $16.6 billion.

Table 2: Earthquake Need for Residential Buildings (in millions of $YOE)

Vulnerability	Number of Units[4]	Units Built Annually[5]	Inflation	Unit Cost[6]	Subtotal[7]
Cripple Wall (Single Family)	185	12	2.2%	$12,000	$3,003
ROG/HOG (Single Family)[8]	45	3	2.2%	$25,000	$1,530
Cripple Wall (Duplex)	31	6	2.2%	$12,000	$1,526
ROG/HOG (Duplex)	16	3	2.2%	$30,000	$1,984
Soft Story (5+ units)	24	21	2.2%	$20,000	$8,527
Total	**301**	**45**			**$16,570**

[4] Regional estimates by UrbanSim scan; shown in thousands.
[5] It is assumed that this project may take approximately 15 years, leading to projected costs through 2035. Shown in thousands.
[6] Costs derived from SME guidance.
[7] Rounded to the nearest million.
[8] Room over Garage (ROH); House over Garage (HOG).

Draft Need: Sea Level Rise through 2050

Sea level rise is a different challenge compared with earthquakes – with each year, it becomes progressively worse, with impacts spiking at times when coupled with king tides, and bad storms. For example, a five-year storm (an event that happens roughly every five years), coupled with just one-foot of sea level rise, would flood communities and infrastructure at three feet above today's sea level. To assess need, areas with flooding impacts at three feet were identified using the Bay Conservation and Development Commission's ART Bay Area mapper. Placeholder strategies of 16 different archetypes (including marsh restoration, traditional levees, and roadway elevations, among others) were then created to address communities vulnerable to that level of inundation, and subsequently edited using the input of various stakeholders. Costs were adjusted to account for the regional variance in construction costs. Additional assumptions can be found in Table 3.

The estimated cost to address sea level rise through year 2050 is approximately $15.1 billion. This preliminary cost estimate is focused primarily on shoreline protection measures to prevent flooding from the bay and ocean, and it does not fully consider upstream flooding impacts from streams and rivers, or the Delta. It does include marsh and subtidal restoration and adaptation projects that would provide ecosystem and flood protection benefits. Staff are working with a broader set of ecological, flood control, and sea level rise subject matter experts to further refine this estimate by January 2020.

Table 3: Sea Level Rise Need (in millions of $YOE)

Strategy[9]	**Cost Assumption**[10]	**Units**	**Subtotal**[11]
Levee – Horizontal (Mild)	$5,800	253,199	$1,468
Levee – Horizontal (Steep)	$2,800	31,667	$88
Levee – Traditional (Minimum Trail)	$1,000	29,034	$29
Levee – Traditional (Average Trail)	$1,200	92,534	$111
Levee – Traditional (2-lane Roadway)[12]	$2,310	129,661	$299
Levee – Traditional (4-lane Roadway)	$3,520	57,656	$202
Levee – Raise Existing Levee	$770	18,984	$14
Seawall - Simple	$4,730	42,779	$202
Seawall – Berm or Amenities	$6,800	9,174	$62
Elevate Roadway (2-lane)	$41,470	12,186	$505
Elevate Roadway (4-lane)	$75,790	74,532	$5,648
Elevate Highway (8-lane)	$116,050	3,055	$354
Marsh Restoration	$47,700	74,884	$3,571
Medium Tidal Gate	$3,000,000	14	$42
Large Tidal Gate	$20,000,000	3	$60
Subtotal			$12,600
Operations and Maintenance[13]			$2,520
Total			**$15,120**

[9] Does not include buyouts or relocation.
[10] Cost assumptions stem from previous research with a consultant. Shown in 2019 dollars.
[11] Subtotal of projects within each strategy; average unit costs per strategy not given due to wide regional variance in project cost. Shown in millions in 2019 dollars- subtotal column may not add up to total as printed due to rounding.
[12] This estimate includes a high level assumption to protect Capitol Corridor, however, no costed archetype was available for railroads specifically. As a result, this estimate is included under Levee – Traditional (2-lane Roadway) for the railroad itself and Elevate Roadway (2-lane) for its bridges.
[13] High-level estimate; assumed to be 20% of the overall total. Subject to further refinement by end of 2019.

Additionally, there is a nexus for adaptation with transportation, as much of the region's infrastructure is susceptible to sea level rise. In some cases, an adaptation measure for transportation may have off-system benefits, as areas adjacent to the transportation asset would benefit from sea level rise protection. In this way, the financing of transportation is simultaneously mitigating the risk for private or public buildings. There may also be the potential for non-transportation adaptation measures to utilize flexible transportation funds if the sea level rise measure is seen to provide a co-benefit a transportation asset. In other scenarios, the transportation asset may be directly adapted, and provide no direct benefit to adjacent areas.

These transportation mitigation projects may have financial benefits for transportation funding. An example of this is the seismic mitigation of the seven state-owned Bay Area toll bridges, which were mitigated by a state seismic bond of in 1996. Today, half of the regular toll fare goes toward the state's Seismic Retrofit Program. In this way, the relationship between resilience and transportation can lead to a series of complex outcomes, which affect both resilience, and even the transportation "bank" of needs and revenues. It is estimated that approximately 60 percent of the regional need for sea level rise has either a direct or indirect nexus with regional transportation assets.

Table 4: Relationship of Sea Level Rise Need with Transportation Funding[14]

Direct Nexus	Indirect Nexus	No Nexus	Total
$7,091	$801	$4,769	$12,600[15]
56%	6%	38%	100%

[14] Shown in 2019 dollars in millions. Shown without operations and maintenance funding.
[15] Column may not add up to total as printed due to rounding.

PLAN BAY AREA 2050

Draft Needs Assessments

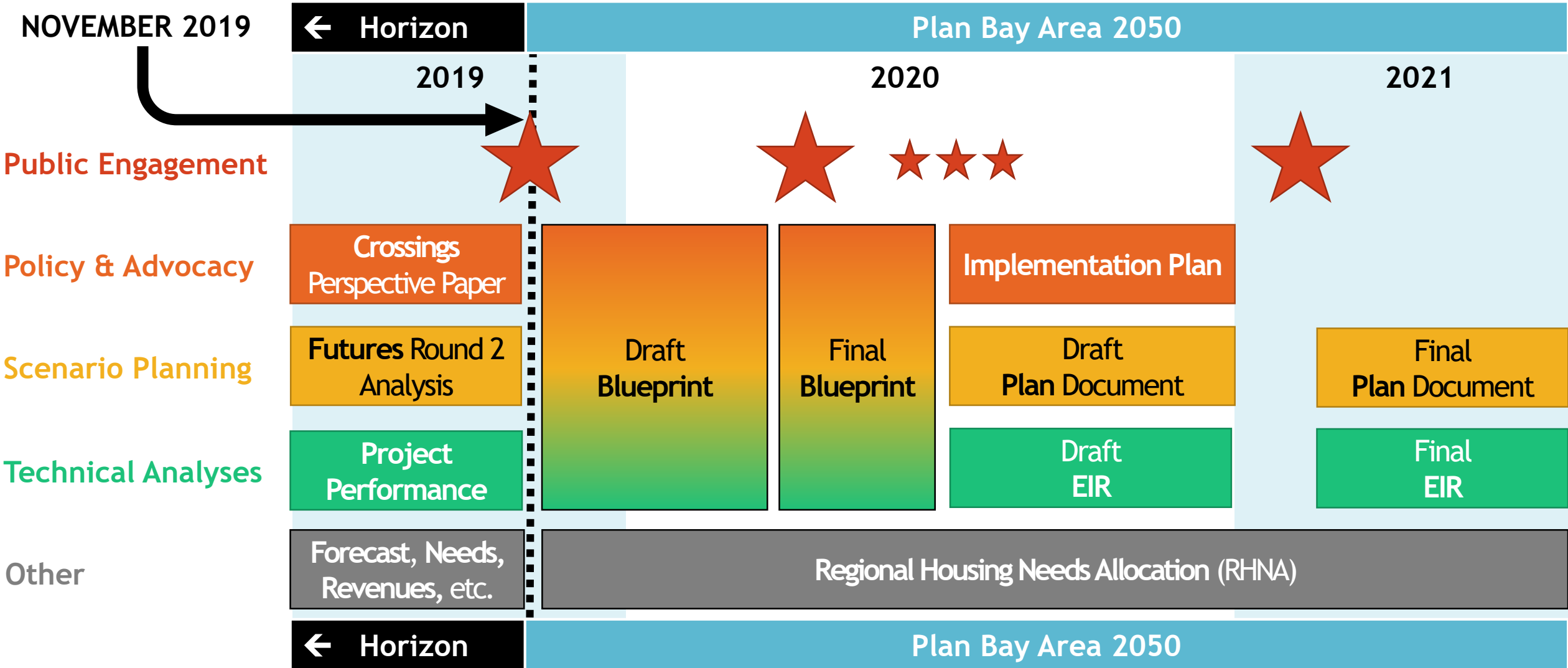
Transportation O&M: William Bacon

Affordable Housing: Dave Vautin

Resilience: Rachael Hartofelis

Regional Advisory Working Group - November 2019

Plan Bay Area 2050 Schedule



Needs and Revenue: Objectives & Definitions

Objectives: to understand the unconstrained financial needs related to critical expenditure categories for Plan Bay Area 2050, as well as baseline available revenues.

What do we mean by "financial needs"?

- *Transportation:* investment needed to operate and maintain the *existing* (publicly owned) transportation system
- *Resilience:* investment needed to protect existing infrastructure and communities from hazards
- *Housing:* investment needed to ensure all households have an affordable housing option

What do we mean by "baseline available revenues"?

- Revenue from local, regional, state, and federal sources that are reasonably expected to be available over the Plan period

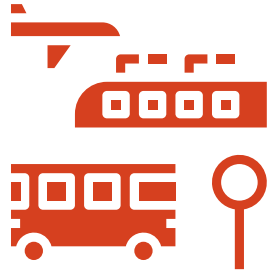
Needs and Revenue: Scope of Work

- **No assessment of baseline needs will capture everything.** Not every critical investment is reflected here; for example, resilience investments go beyond preparing for sea level rise and earthquakes. That being said, we feel it is important to create a "version 1.0" for these critical topic areas.
- **The future is uncertain.** As explored in Horizon, future needs and revenues could be influenced by external forces beyond our control. Despite the uncertainty of the world today, we are doing our best to come up with a likely estimate based on information available today.
- **Consistency is key.** All needs and revenue data is shown in year-of-expenditure dollars with an escalation rate of 2.2%.

Important Caveats:

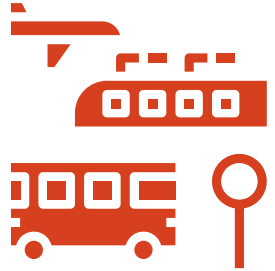
All needs estimates are in **preliminary draft** form at this early stage of Plan Bay Area 2050. Revenue estimates will be available in December.

Transportation Needs Methodologies



- **Local street & road and bridge** maintenance needs were estimated using StreetSaver®, a pavement management system used by all Bay Area jurisdictions in combination with input and estimates from the 2018 California LSR Needs Assessment.
- **Bicycle/pedestrian and other non-pavement infrastructure** maintenance needs estimated using StreetSaver® and prediction models for accompanying local street and road infrastructure
- **Regional bridge** needs were estimated using the Bay Area Toll Authority's bridge maintenance, rehab, and replacement schedules and cost estimates.
- **State highway and bridge** needs were estimated using information for District 4 (San Francisco Bay Area) in Caltrans' 2019 State Highway System Management Plan and Fiscal Year 2019/20 Project Book.

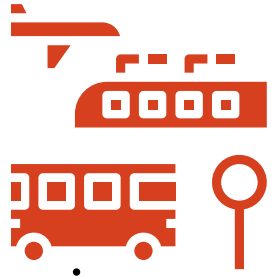
Transportation Needs Methodologies



- **Transit capital** maintenance needs were developed using the Regional Transit Capital Inventory – an inventory of every public transit asset in the region– and TermLite, a software that models the cost of replacing transit assets over time based on the assets' useful life. Assumes replacement of existing bus fleet with zero emission buses in compliance with CARB's Innovative Clean Transit Regulation. Assumes in-kind replacement, without major upgrade, of other assets.

- **Transit operating** needs are estimated using information provided by the region's public transit operators on the cost of maintaining today's current level of service (16.8 million service hours per year) over the Plan period.

Transportation Summary



- **$417 billion** to improve and maintain the system in a state of good repair
- **$385 billion** to prevent further deterioration / maintain existing conditions

30-Year Transportation Operations and Capital Maintenance Needs (in billions of $YOE)

	Local Streets, Roads,& Local Bridges	Regional Bridges	State Highway & Bridge	Transit Capital	Transit Operating	Total Operations and Capital Maintenance Needs	Plan Bay Area 2050 Draft Transportation Revenue
Maintain Existing Conditions	$64.4	$19.4	$24.4	$59.4	$217.8	$385.4	TBD
State of Good Repair	$71.0	$19.4	$24.4	$84.6	$217.8	$417.2	TBD

Note: Two condition scenarios could only be calculated for Local Streets, Roads, and Local Bridges, and Transit Capital

Needs and Revenue

Affordable Housing Overview

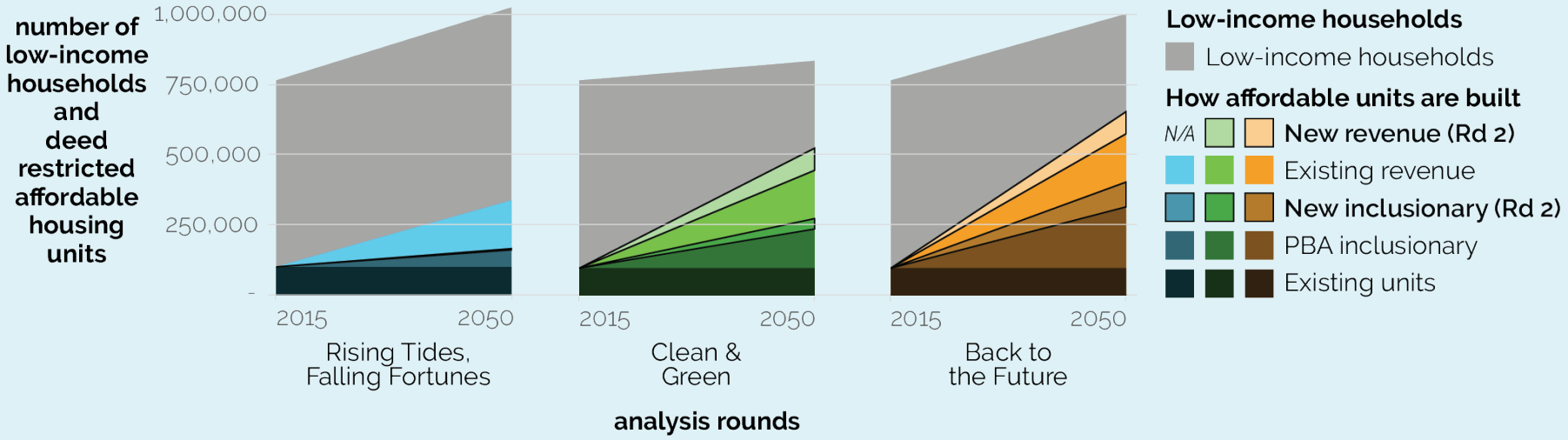
- **Key caveat:** this is the first time MTC/ABAG has conducted a Needs & Revenue Assessment for affordable housing; we expect these draft estimates to be further refined this cycle and in future cycles of the long-range plan.
- **Goal:** identify the gap between existing affordable housing and future needs for low-income households, building upon work from the CASA effort.
- **Note:** low-income households are defined as those earning less than $45,000, who are least likely to be served by market-rate development.

Building Upon Work from…

HORIZON

Futures Analysis
Rounds 1 & 2

Number of deed restricted affordable housing units and the number of low-income households



Affordable Housing Needs Methodology

- There are **roughly 100,000 existing deed-restricted affordable housing units** in the Bay Area today. *(source: NPH/CHPC)*
- As of 2020, we expect there will be approximately 766,000 low-income households* in the Bay Area - **an existing gap** of 666,000 deed-restricted units**.
- Between 2020 and 2050, we expect there will be an additional 70,000 low-income households added to the Bay Area* - **yielding a combined gap of 736,000 deed-restricted units by 2050.**
- **A per-unit subsidy of $450,000** - which could come from a variety of different existing and future revenue sources - was assumed to estimate associated financial needs. *(source: CASA)*

* The analysis uses the growth forecast for the Clean and Green Future from Horizon as a placeholder until the Draft Regional Forecast is released.
** Assuming that all low-income households live in a deed-restricted unit by 2050.

Needs and Revenue

Resilience Overview

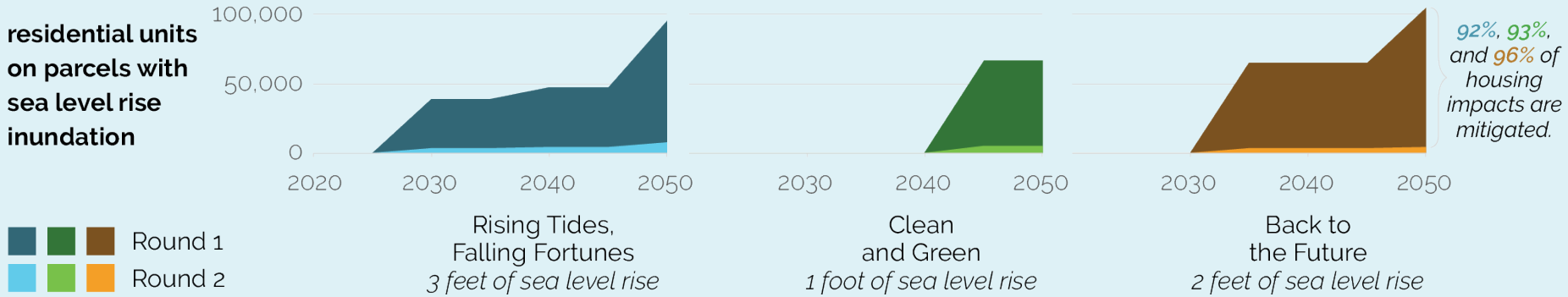
- **Key caveat:** this is the first time MTC/ABAG has conducted a Needs & Revenue Assessment for environmental resilience; we expect these draft estimates to be further refined this cycle and in future cycles of the long-range plan.
- Therefore, the Resilience Needs & Revenue Assessment focuses on two specific high-priority resilience issue areas:
  - **Sea Level Rise** *(focus on protecting most of the region's shoreline through 2050)*
  - **Earthquakes** *(focus on residential buildings, given recent investments in transportation infrastructure)*

Building Upon Work from…

HORIZON

Futures Analysis
Rounds 1 & 2

Residential sea level rise impacts in Futures round 1 (without adaptation) and round 2 (with adaptation)



Resilience Needs Methodologies

Sea Level Rise (SLR)

- Strategies include both “gray infrastructure” (seawalls, levees, etc.) and “green infrastructure” (marsh restoration, etc.).
- Sea level rise protection height is based upon two feet of permanent inundation and one foot of temporary flooding from a storm. ART Bay Shoreline Flood Explorer was used to identify areas of inundation.

Resilience Needs Methodologies

Earthquakes

- No regional structural dataset is available, so high level estimates were created with existing building data. Estimates were determined by UrbanSim.
- Vulnerable types include structures with cripple walls, soft stories, and/or house/room over garage.

Category		All costs are in billions of YOE dollars		
		Anticipated Revenue	Anticipated Needs	Anticipated Gap
	Public Transit Operations	TBD	$218 billion	TBD
	Public Transit State of Good Repair[1]		$85 billion	
	Local Streets & Bridges State of Good Repair[1]		$71 billion	
	Highways State of Good Repair		$24 billion	
	Bridges State of Good Repair		$19 billion	
	Affordable Housing[2]	TBD	$473 billion	TBD
	Sea Level Rise Adaptation	TBD	$15 billion	TBD
	Seismic Mitigation[3]	TBD	$17 billion	TBD
TOTAL		**TBD**	**$922 billion**	**TBD**

Technical Footnotes:

1. *Need reflects funding to get to an ideal state of good repair, rather than simply maintaining existing conditions.*
2. *Need reflects funding to provide deed-restricted affordable housing to all low-income households by year 2050.*
3. *Need is focused solely on residential buildings.*

Remaining fields in this table will be populated in December with anticipated revenues available.

Next Steps

- **November:** allow for continued review of needs assessments & refine needs based on feedback received
- **December:** share initial revenue estimates for transportation, housing, and resilience; integrate Draft Regional Forecast
- **January:** finalize Needs & Revenue work in time for Draft Blueprint analysis

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1197	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Staff Liaison Report (5 minutes) Relevant MTC policy decisions and other activities.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:	08_Staff_Liaison_Report Nov 2019.pdf				

Date	Ver.	Action By	Action	Result

Subject:
Staff Liaison Report
(5 minutes)

Relevant MTC policy decisions and other activities.

Presenter:
Marti Paschal, Staff Liaison

Recommended Action:
Information

Attachments:

Metropolitan Transportation Commission

Policy Advisory Council

November 13, 2019 **Agenda Item 8**

Staff Liaison Report – November 2019

Subject: Relevant MTC policy decisions and other activities.

Recommendation: Information

Attachments: Attachment A: Staff Liaison Report – November 2019

METROPOLITAN
TRANSPORTATION
COMMISSION

Agenda Item 8
Attachment A
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Memorandum

TO:	Policy Advisory Council	DATE:	November 13, 2019
FR:	Marti Paschal, Staff Liaison	W.I.	1114
RE:	Staff Liaison Report – November 2019		

CA Legislative Cycle Wrapped Up as Governor Signed MTC-Supported Housing Bills
The 2019 California legislative cycle wrapped up last month as Governor Newsom signed and vetoed dozens of bills to meet the October 13 deadline. MTC took positions on a number of housing bills that emphasized protection of tenants, production of more housing, and preservation of existing affordable housing throughout the region. MTC ultimately supported the following eight bills, all of which have now been signed into law:

Protection Bills
- AB 1482 (Chiu), which enacts a 10-year statewide cap of 5 percent on annual rent increases (plus a cost-of-living adjustment based on the regional Consumer Price Index that would allow rents to rise by up to 10 percent in a single year), to protect tenants from extreme rent increases. The bill also establishes a "just cause" eviction policy for 10 years, prohibiting landlords from evicting tenants without "just cause" to do so, requiring that the cause be stated in writing, and requiring relocation assistance in "no-fault" cases.

Production Bills
- AB 68 (Ting), which makes it easier for homeowners to create Accessory Dwelling Units (ADUs), also known as "casitas" or "granny units," by easing restrictions and speeding up the permitting process. A related bill, SB 13 (Wieckowski), on which MTC took a "seek amendments" position, also was signed into law, prohibiting local agencies from requiring replacement off-street parking or from imposing an owner-occupancy requirement for an ADU permit. SB 13 also prohibits impact fees for an ADU less than 750 square feet and caps fees at 25 percent for an ADU of 750 square feet or larger.
- AB 1483 (Grayson), which requires cities, counties and special districts to post on their websites a current schedule of fees and affordability requirements applicable to housing projects, as well as an archive of nexus studies conducted since January 1, 2018. The bill also requires the Department of Housing and Community Development (HCD), in its next and every subsequent update of the California Statewide Housing Plan, to include a 10-year housing data strategy that identifies data useful to enforce housing laws and inform policymaking, and to establish a workgroup, inclusive of local governments and metropolitan planning organizations, to inform that effort.
- AB 1485 (Wicks), which expands streamlining opportunities for affordable housing projects in the San Francisco Bay Area that dedicate at least 20 percent of the total units to moderate-income households with incomes below 120 percent of the area median.
- AB 1486 (Ting), which revises ambiguities in the Surplus Land Act in order to provide affordable housing developers a clear "right of first refusal" opportunity when public agencies are disposing of surplus land.

- SB 6 (Beall), which provides more transparency about the land available for housing development by requiring HCD to create a database of land suitable for residential development as provided by local agencies in their housing elements and of "excess" state land.
- SB 330 (Skinner), which aims to accelerate housing development by providing developers with greater certainty about requirements and speeding up the overall project review process for five years.

Preservation and Funding Bills

- AB 1487 (Chiu), which authorizes ABAG and MTC (acting as a newly authorized "Bay Area Housing Finance Authority") to place various measures on the ballot within the nine-county Bay Area to fund affordable housing production, preservation of existing affordable housing, and tenant protection. Measures which voters may consider may include a general obligation bond, an employee "head tax," a parcel tax and a gross receipts tax.

Vital Signs Update Highlights Record High Home Prices and Rent Payments

MTC and ABAG recently concluded a series of updates to the Economy indicators on *Vital Signs*, MTC/ABAG's regional performance monitoring initiative. The latest data on median rent payments and home prices across the region are now available on *Vital Signs*, alongside recently updated data for other Economy indicators, ranging from unemployment to economic output. To check out the Vital Signs website, click here.

Barrier Installation Begun for New Richmond-San Rafael Bridge Bicycle/Pedestrian Path

Crews began work in October to install the moveable concrete barrier that will separate the two westbound traffic lanes on the upper deck of the Richmond-San Rafael Bridge from a new bicycle/pedestrian path expected to open later this fall. Installation work is scheduled for the overnight hours of 9 p.m. to 5 a.m., restricting westbound traffic across the bridge to the far left lane each weeknight. The four-mile-long bridge path will connect to another new bicycle/pedestrian path that runs along the north side of Interstate 580 in Richmond and is protected from freeway traffic by a permanent concrete barrier. Together, these bi-directional paths stretch for almost six miles from Castro Street in Richmond to East Francisco Boulevard in San Rafael, providing the first-ever route for bicyclists and pedestrians traveling between Marin County and the East Bay. These new paths are a key link in the planned 500-mile Bay Trail network.

Both the Richmond-San Rafael Bridge barrier and a barrier-transfer machine (also known as a "zipper truck") were manufactured by, and will be installed by, Lindsay Transportation Solutions of Rio Vista, which also built and installed the roughly 2.5-mile-long moveable median barrier on the Golden Gate Bridge. Though conceptually similar to the 32-inch-tall Golden Gate Bridge barrier, each of the 3.28-foot-long segments of the Richmond-San Rafael Bridge barrier features a plastic attachment that raises its height to 42 inches to meet published standards for bicycle safety railings. The individual barrier sections weigh 1,575 pounds and feature rubber feet to prevent water from pooling at the barrier's base and to prevent damage to the concrete bridge deck. Once the barrier is fully installed, trained crews using the "zipper truck" will be able to quickly reposition it as necessary to allow crews working for Caltrans and the Bay Area Toll Authority (BATA) to complete bridge maintenance tasks during short closures of the bicycle/pedestrian path.

Performance of the new bicycle/pedestrian path will be monitored and assessed continually as data becomes available on the use of the path by bicyclists and pedestrians, and operational adjustments will be made as needed. This evaluation will include a before-and-after study conducted by Caltrans and the University of California's Partners for Advanced Transportation Technology (PATH) program. BATA and Caltrans are now conducting a study of the bridge's load rating to evaluate the span's structural capacity for both current and future conditions. This study is slated for completion in the spring of 2020 and will

include analysis of three westbound traffic lanes with the moveable barrier on the upper deck. The Transportation Authority of Marin (TAM) also has begun working on a corridor traffic analysis to identify improvements that may be needed on the Marin County side of the bridge to accommodate three lanes of westbound traffic across the span.

The $20 million Richmond-San Rafael bicycle/pedestrian path and the $36 million third eastbound traffic lane that opened on the lower deck of the bridge in April 2018 were developed as four-year pilot projects through a partnership between BATA, Caltrans, the Contra Costa Transportation Authority and TAM.

Last Section of the Marin-Sonoma Narrows Project in Sonoma Has Broken Ground
On October 2, groundbreaking of the last segment of the Marin-Sonoma Narrows project in Sonoma County began. The 3.3 mile segment is in Petaluma and will take about three years to complete. MTC has long identified improvements to the U.S. 101 corridor in the North Bay as an important regional priority, including the Marin-Sonoma Narrows, where lanes narrow from three to two creating bottlenecks.

MTC contributed $15 million in re-purposed federal earmarks, $15.4 million in Surface Transportation Program (STP) funds and $23 million in Regional Transportation Improvement Program (RTIP) funds, and monies from the Prop 1B Corridor Improvement program. Marin County is pursuing funding to complete its final piece.

Fed Spotlights Innovations in MTC-Backed Design Challenge
The Bay Area Regional Collaborative — which includes MTC, the Association of Bay Area Governments, the Bay Area Air Quality Management District and the Bay Conservation and Development Commission — earned recognition by the Federal Reserve Bank of San Francisco with publication of a new paper authored by BARC Executive Director Allison Brooks in the bank's Community Development Innovation Review.

Entitled *Drawing a New Roadmap: The Resilient by Design Bay Area Challenge*, the paper synthesizes lessons that emerged from the collaborative 2017-18 effort to develop strategies for adapting to the impacts of sea-level rise along the San Francisco Bay shoreline, including the need to use multi-benefit projects to leverage diverse financing sources and to build on community knowledge in the first steps of the design process. The MTC-backed Resilient by Design Bay Area Challenge produced nine innovative design concepts, and confronted questions of community development such as how to best engage at-risk populations in critical decisions, and how municipalities should incorporate resilience into capital planning.

The October 2019 issue of the San Francisco Fed's Community Development Innovation Review focuses on strategies for dealing with climate-change risks in lower- and moderate-income communities, and addresses the financial challenges of global warming.

Executive Director's Report
The following items are excerpts from the October 2019 Executive Director's Report to the Commission. To read the report in its entirety go to:
http://www.mtc.ca.gov/whats-happening/news/executive-directors-report.

APTA National Conference: TransFORM
I attended the conference held in New York, moderating a session on "Cities and Mobility." The Bay Area was well represented among APTA's annual awards, honoring Senator Jim Beall with the State Distinguished Service award; and Chair Haggerty accepting an "AdWheel" Grand Award for Livermore Amador Valley Transportation Authority. VTA was also awarded an AdWheel Grand Award. Jason Weinstein was a presenter highlighting the region's planned advancements for the Clipper program.

Mega-Measure (FASTER Bay Area)
The Executive Committee met on October 11, 2019 to discuss key expectations and communications to representatives for the FASTER Bay Area proposal, to help inform the presentation that is agendized today. The Chair and Vice Chair have requested an ongoing presence in future strategic level discussions; staff is engaged in technical discussions, focusing on coordination with Plan Bay Area 2050 development in particular. We will be providing standing reports to the Commission on the status of this and any other mega measure initiatives, such as principles being advanced by community stakeholders coalesced by Voices for Public Transit.

Housing Update
Central to our long range planning work is housing related policy and analysis. Significant initiatives were passed by the Legislature and reported to the Legislation Committee. Among the key bills signed by the Governor was AB 1487, authorizing the Bay Area Housing Finance Authority. MTC and ABAG leadership are outlining a strategy regarding next steps for this bill, and will report back through the joint ABAG and MTC Legislative Committee meetings over the ensuing months. As well, ABAG's Housing Methodology Working Group met on October 18th in a productive kick-off of an intensive effort supporting the Regional Housing Needs Assessment (RHNA).

Equity Platform
Today I am presenting an "Equity Platform" as an essential framing for our external and internal work at MTC and ABAG. This initiative will also be presented to the ABAG Executive Committee in November. I would note that Commissioner Amy Worth accompanied me, Nalungo Conley, Ky-Nam Miller and Judis Santos to the conference "Connecting Equity and Transportation", developed and sponsored by the UCLA Institute of Transportation Studies and Lewis Center for Regional Policy Studies. The conference underscored the critical need for integrating and being accountable to equity in policy, service delivery and advocacy, as is embodied in the Platform.

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1198	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	Council Member Reports (10 minutes) Members of the Council may report on locally relevant issues or events.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:					

Date	Ver.	Action By	Action	Result

Subject:
Council Member Reports
(10 minutes)

Members of the Council may report on locally relevant issues or events.

Presenter:
Randi Kinman, Council Chair

Recommended Action:
Information

Attachments:

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Metropolitan Transportation Commission

Legislation Details (With Text)

File #:	19-1199	**Version:**	1	**Name:**	
Type:	Report			**Status:**	Informational
File created:	10/11/2019			**In control:**	Policy Advisory Council
On agenda:	11/13/2019			**Final action:**	
Title:	New Business (5 minutes)				
	Members of the Council may bring up new business for discussion or addition to a future agenda.				
Sponsors:					
Indexes:					
Code sections:					
Attachments:					

Date	Ver.	Action By	Action	Result

Subject:
New Business
(5 minutes)

Members of the Council may bring up new business for discussion or addition to a future agenda.

Presenter:
Randi Kinman, Council Chair

Recommended Action:
Discussion

Attachments: