Highway 17 BPOC – Bridge Type Selection Evaluation

To reach a recommended bridge alternative, the BKF Team used the attached Alternative Analysis Matrix as a tool to evaluate the three structure alternatives against both technical design criteria and overall community acceptance.

TECHNICAL CONSIDERATIONS

BKF analyzed the various alternatives within the attached matrix based on the following technical considerations identified below. Each alternative was then evaluated using a 1- to 3-point rating scale to determine the worst and best option under each category. The reasoning to establish each rating assignment is summarized below:

- Architectural Distinction – Each structure's general aesthetic appeal, uniqueness of design, final finishes, etc. was evaluated against one another. The steel arch provides the highest level of visual interest and architectural distinction from the various view points analyzed by Highway 17, WB or EB Blossom Hill Road, and walking or biking on each structure as well. For this reason, the steel arch was assigned a 3-point rating, and the other two options received 2-point and 1-point ratings, respectively.
- Visual Impacts – Each option was evaluated based on their visual change to the existing environment in this category. The concrete alternative matches existing conditions most given the existing Blossom Hill Road Overcrossing so a 3-point rating was established. The two steel alternatives were given a 2-point rating since the visual character appears to change moderately from existing conditions.
- Impacts to Highway 17 – This criterion rates each option based on the anticipated impacts to Highway 17. The steel truss options have the ability to span Highway 17 without the need for a center column within the highway median in comparison with the concrete option. A 3-point rating is therefore assigned to the steel options and a 1-point rating for the concrete option.
- Maintenance & Inspection – Regular inspection and maintenance requirements differ for each bridge type and require consideration over each structure's life given there are associated long-term costs. Steel bridges require routine painting, corrosion protection, and detailed inspections in comparison to concrete structures. A higher 3-point rating was therefore given to the concrete structure and a 1-point rating for each steel structure alternative.
- Stage Construction Traffic Impacts – Each bridge structure requires different approaches to construction staging and therefore different traffic management strategies. The highest rating was given to the bridge alternative with the least amount of anticipated impacts to traffic operations during bridge construction. Both alternatives will require freeway closures, but the concrete option will generally require fewer duration closures that can be phased in comparison to the steel options. A higher 3-point rating was therefore established for the concrete option over the two steel options that require a full freeway closure.
- Construction Cost – The estimated $25.2M construction cost for the concrete option is considerably less than the two steel options estimated to be $36.2M and $38.8M, respectively. Although costs will fluctuate between now and when the Town takes the Project to bid, the considerable difference between each now is reflected in the 3-point and 1-point ratings assigned for concrete and steel, respectively.
- Construction Schedule – Each alternative was evaluated in consideration to the general length of construction and flexibility of construction methods to meet potential Project constraints. The concrete option has the shortest construction timeframe and design flexibility with the center

column support, so we assigned a 3-point rating for this option. The steel options have somewhat longer construction schedules and flexibility to accommodate potential project constraints given the need to order the steel materials and field splicing during construction. Moreover, steel requires source inspection by Caltrans, which will take longer to complete in comparison to the concrete structure construction. For these reasons, the steel options were given slightly less ratings at 2-points.

Although not shown in the matrix, the BKF Team also evaluated the various alternatives amongst several additional criteria that included:

- User Friendliness
- Safety/Security
- Environmental Impacts (Cultural, Biological, Tree Removal)
- Compliance with Caltrans Standards
- Utility Constraints
- Right of Way Constraints

The different alternatives measured comparably with no notable differences in each of these categories. Each was therefore removed and the criteria used in the matrix was limited to the technical considerations that serve as points of comparison for each option.

Weight factors were given to each technical consideration category above based on their overall impact to the Project's scope, budget, and schedule. The noted ratings were then multiplied by the weight factors to determine the net scores for each alternative summarized below:

- **Option 1: Concrete Box-Girder – 240 Points**
- Option 2A: Steel Flat Truss – 155 Points
- Option 2B: Steel Arch Truss – 175 Points

The above results determined that from a technical point of view, the Concrete Box-Girder is the preferred structure option to carry forward.

STAKEHOLDERS AND COMMUNITY ACCEPTANCE

The BKF Team and the Town held a number of community activities and events over the course of the last year to raise project awareness and solicit community feedback from various stakeholders that use the existing roadway. These activities and events, including the number of documented participants at each, are summarized below:

- Community Workshop #1 (Virtual) – December 2, 2021 – 33 participants
- Community Workshop #2 (Virtual) – June 29, 2022 – 5 participants
- Pop-Up Events
    - Los Gatos Farmer's Market – March 28, 2022 – 62 participants
    - Los Gatos Creek Trail – April 20, 2022 – 54 participants
    - Spring Into the Green – April 24, 2022 – 100 participants
- Online Survey – September 16, 2022 to October 7, 2022 (3 weeks) – 266 participants

In addition to these community activities, the Town and BKF Team met with several project stakeholder groups since the Project formally began in early 2020:

- Adjacent Communities (Ohlone Ct, Serra Ct, and Los Gatos Oaks)

- Los Gatos Unified School District (LGUSD)
- Complete Streets and Transportation Commission (CSTC)

Although many of the representatives from these various groups attended the larger community meetings, pop-up events, council meetings, etc., we assigned standalone categories to represent each stakeholder group's level of support for each alternative.

Equal weight factors of 10% were assigned to each stakeholder group and the majority of all community activities based on the number of participants. Two events had significantly higher participation – Spring Into the Green and the Online Survey – so greater weight factors of 15% and 25% were applied to each respectively, and proportioned based on their level of participation. In addition, we combined the two community workshops into one category representing a total 10% weight factor given the low participation in Community Workshop #2.

Stakeholders and community members were able to provide meaningful feedback through the community outreach activities. Each event gave the public an opportunity to show their level of support for each structure option raging from "Not Supportive at All" to "Strongly Supportive." BKF used the results from each event to develop a quantitative analysis by assigning points ranging from -2 to 2 for each participant response corresponding to their level of support for each bridge alternative. The results of the quantitative analysis developed for the various outreach events are summarized in the tables below:

Table 1: Community Workshops #1 & #2

	Not Supportive at All -2		Not Supportive -1		Neutral 0		Supportive 1		Strongly Supportive 2		Total Votes	Total Points
Option 1 - Concrete Box Girder	1	-2	0	0	9	0	6	6	5	10	21	14
Option 2A - Steel Flat Truss	2	-4	5	-5	4	0	9	9	3	6	23	6
Option 2B - Steel Arch Truss	13	-26	1	-1	0	0	6	6	7	14	27	-7

Table 2: Farmer's Market

	Not Supportive at All -2		Not Supportive -1		Neutral 0		Supportive 1		Strongly Supportive 2		Total Stickers	Total Points
Option 1 - Concrete Box Girder	6	-12	5	-5	15	0	13	13	32	64	71	60
Option 2A - Steel Flat Truss	8	-16	1	-1	16	0	26	26	15	30	66	39
Option 2B - Steel Arch Truss	8	-16	4	-4	7	0	18	18	25	50	62	48

Table 3: Los Gatos Creek Trail

	Not Supportive at All -2		Not Supportive -1		Neutral 0		Supportive 1		Strongly Supportive 2		Total Stickers	Total Points
Option 1 - Concrete Box Girder	10	-20	8	-8	12	0	4	4	20	40	54	16
Option 2A - Steel Flat Truss	2	-4	4	-4	21	0	14	14	13	26	54	32
Option 2B - Steel Arch Truss	4	-8	6	-6	7	0	10	10	27	54	54	50

Table 4: Spring into Green

	Not Supportive at All -2		Not Supportive -1		Neutral 0		Supportive 1		Strongly Supportive 2		Total Stickers	Total Points
Option 1 - Concrete Box Girder	10	-20	12	-12	31	0	11	11	15	30	79	9
Option 2A - Steel Flat Truss	7	-14	6	-6	24	0	30	30	13	26	80	36
Option 2B - Steel Arch Truss	4	-8	5	-5	9	0	17	17	66	132	101	136

Table 5: Online Survey

	Not Supportive at All -2		Not Supportive -1		Neutral 0		Supportive 1		Strongly Supportive 2		Total Votes	Total Points
Option 1 - Concrete Box Girder	31	-62	26	-26	35	0	69	69	98	196	259	177
Option 2A - Steel Flat Truss	57	-114	48	-48	57	0	61	61	32	64	255	-37
Option 2B - Steel Arch Truss	67	-134	49	-49	46	0	36	36	56	112	254	-35

The results of the quantitative analysis were used to establish the 1 to 3 rating for each alternative in the attached matrix. A rating of 3 was given to the option with the highest number of total points and a rating of 1 was given to the option(s) with the lowest number of total points.

A quantitative analysis based on our interactions with each of the stakeholder groups was more challenging since we did not solicit formal feedback on each participant's level of support for each alternative. The BKF Team assigned different ratings for each bridge alternative based on their general sentiment. For the Adjacent Communities category, we got the impression that several community representatives were concerned that the steel bridge alternatives would create more of a visual impact from their respective communities and would prefer the concrete option over the two steel options. To take this difference into consideration, a 3-point rating was assigned to the concrete option and a 1-point rating towards both steel options. Interactions with the CSTC and LGUSD were significantly different in that both stakeholder groups expressed strong support for the Project overall regardless of the different bridge alternatives. Although there may be slight preferences for one alternative over another with specific individuals, we did not get the feeling one was preferred over another, and therefore assigned a 3-point rating to each alternative.

The rating given to each option based on the quantitative analysis and reasoning provided above was multiplied by the weight factors given to determine the net scores for each alternative. The net results are summarized below:

- **Option 1: Concrete Box-Girder – 250 Points**
- Option 2A: Steel Flat Truss – 175 Points
- Option 2B: Steel Arch Truss – 200 Points

The above results determined that based on the stakeholder and community feedback received, the Concrete Box-Girder is the preferred structure option to carry through the next phase of the Project.

SUMMARY

Taking into consideration both the technical considerations and community acceptance feedback received, the Concrete Box-Girder alternative prevailed as the preferred option as summarized below:

- **Option 1: Concrete Box-Girder – 490 Points**
- Option 2A: Steel Flat Truss – 330 Points

- Option 2B: Steel Arch Truss – 375 Points

Based on these results, the BKF Team in collaboration with the Town of Los Gatos recommends approval of the Concrete Box-Girder as the preferred bridge type for the Highway 17 Bicycle and Pedestrian Overcrossing Project.

Highway 17 BPOC – Bridge Type Selection Evaluation

connect stay SKATE LOS GATOS BIKE walk gather JOG

2016 MEASURE B YA

TOWN OF LOS GATOS

BKF

BCA MIG

IMPLEMENTING AGENCY: The Town of Los Gatos

CONTACT: Michelle Quinney, Special Projects Manager, mquinney@losgatosca.gov

LEAD CONSULTANT: BKF Engineers

SELECTION CRITERIA							
Technical Considerations							
Design Considerations	**Wt. Factor**	**Baseline**					
Architectural Distinction (1=Best; 5=Worst)	20	60					
Visual Impacts (1=Best; 5=Worst)	5	15					
Impacts to Highway 17 (1=Best; 5=Worst)	10	30					
Maintenance & Inspection (1=Best; 5=Worst)	20	60					
Stage Construction Traffic Impacts (1=Best; 5=Worst)	5	15					
Construction Cost (1=Best; 5=Worst)	30	90					
Construction Schedule (1=Best; 5=Worst)	10	30					
TECHNICAL CONSIDERATIONS RATINGS		**300**	**OPTION 1 CONCRETE BOX-GIRDER**		**OPTION 2A STEEL FLAT TRUSS**		**OPTION 2B STEEL ARCH TRUSS**
			Rating	**Value**	**Rating**	**Value**	**Rating**	**Value**
Architectural Distinction (1=Best; 5=Worst)	20	60	1	20	2	40	3	60
Visual Impacts (1=Best; 5=Worst)	5	15	3	15	2	10	2	10
Impacts to Highway 17 (1=Best; 5=Worst)	10	30	1	10	3	30	3	30
Maintenance & Inspection (1=Best; 5=Worst)	20	60	3	60	1	20	1	20
Stage Construction Traffic Impacts (1=Best; 5=Worst)	5	15	3	15	1	5	1	5
Construction Cost (1=Best; 5=Worst)	30	90	3	90	1	30	1	30
Construction Schedule (1=Best; 5=Worst)	10	30	3	30	2	20	2	20
			240		**155**		**175**	
Stakeholder and Community Acceptance								
Outreach Events	**Wt. Factor**	**Baseline**	**Rating**	**Value**	**Rating**	**Value**	**Rating**	**Value**
Adjacent Communities (1=Best; 5=Worst)	10	30	3	30	1	10	1	10
Los Gatos Union School District (LGUSD) (1=Best; 5=Worst)	10	30	3	30	3	30	3	30
Complete Streets & Transportation Commission (CSTC) (1=Best; 5=Worst)	10	30	3	30	3	30	3	30
Community Workshops (1=Best; 5=Worst)	10	30	3	30	2	20	1	10
Farmer's Market (1=Best; 5=Worst)	10	30	3	30	1	10	2	20
Los Gatos Creek Trail (1=Best; 5=Worst)	10	30	1	10	2	20	3	30
Spring Into Green (1=Best; 5=Worst)	15	45	1	15	2	30	3	45
Online Survey (1=Best; 5=Worst)	25	75	3	75	1	25	1	25
STAKEHOLDER AND COMMUNITY ACCEPTANCE RATINGS		**300**		**250**		**175**		**200**
RATING SUMMARY		**600**		**490**		**330**		**375**
Overall Ranking (3=Preferred Option; 1=Unfavored Option)				**3**		**1**		**2**

RATING CRITERIA DESCRIPTION
General aesthetic appeal of structure. Uniqueness of design, finishes, etc. (3) Arch shape creates architectural distinction and enhances visual interest from pathway and roadway (2) Enhanced Standard Truss with more utilitarian visual character than Steel Arch Truss (1) Utilitarian visual character
Overall visual change. (3) Lowest Level of Visual Change (2) Moderate Level of Visual Change
Anticipated impacts to Highway 17 with installation of a center column in the freeway median. (3) Structure Clear Spans Highway 17 (1) Requires Central Pier in Freeway Median
Regular inspection and maintenance requirements. Anticipated structure life cycle and associated costs. (3) For Concrete Box Girder (low maintenance) (1) For Steel Flat Truss and Steel Arch Truss (increased maintenance)
Anticipated impacts to traffic operations for installation of bridge deck or construction of falsework over Highway 17. (3) Full Freeway Closure - One Night Short Term Closure (4-5 hours during the night) (1) Full Freeway Closure - Two Nights Short Term Closures (4-8 hours during the night) for One Weekend Minimum and Two Weekends Maximum.
Estimated Project Cost, including construction in Year 2028. All costs are approximate and subject to change. (3) Total Estimated Project Cost = $25.2M (1) Total Estimated Project Cost = $30.2M for Steel Flat Truss and $38.8M for Steel Arch Truss
General length of construction and flexibility of construction methods to meet potential project constraints. (3) For Concrete Box Girder with column/foundation on freeway median (2) For Steel Flat Truss and Steel Arch Truss with moderate field splices

RATING CRITERIA DESCRIPTION
BKF and the Town have heard from representatives of the Oklone and Serra Cl Communities on several occasions that include the larger community meetings, pop-up events, council meetings, and one-on-one meetings. The most recent one-on-one meeting was held in the field with the Oklone Cl Community on October 19, 2022. Although there are supporters, the general sentiment from these interactions is that they do not support the project and that the steel options would create the most visual impact. However, if the Town were to build one of those presented, the concrete option would be supportive above the two steel options. To take into consideration this difference, a 3-point rating is assigned to the concrete option and a 1-point rating towards both steel options.
BKF and the Town have coordinated with the LGUSD on several occasions within the past few years. These include attending Back to School nights at various nearby schools, meetings with School Principals, Teachers, and Students at various events. The most recent meeting with LGUSD Principals was held on March 25th, 2022. The general sentiment from these interactions and students is overwhelming support of the Project. For this reason, a 3-point rating is assigned to all three project alternatives identified.
The Town has met with the CSTC on a monthly basis since the Project's inception and there is overwhelming support. Although there may be preferences on the various alternatives, there is general support for all bridge options, therefore a 3-point rating is assigned to all three project alternatives identified.
First and Second Online Community Workshops held on 12/2/2021 and 6/29/2022 respectively. There were approximately 55 attendees at the First Community Workshop and approximately 5 attendees at the Second. The live poll results obtained at both meetings were used to develop a quantitative analysis. Points ranging from -2 to 2 were given to each vote based on the level of support given to each structure option, which ranged from "Not Supportive at All" to "Strongly Supportive". Rating is based on the results of the quantitative analysis. (3) 14 Total Points for Concrete Box Girder (2) 6 Total Points for Steel Flat Truss (1) -7 Total Points for Steel Arch Truss
Pop-Up Event held at the Town's Farmer's Market on March 27th, 2022. There were approximately 62 participants at this event. Participants placed stickers on a Project Board to show their level of support for each structure option. The total number of stickers placed on the Project Board were used to develop a quantitative analysis. Points ranging from -2 to 2 were given to each vote based on the level of support given to each option, which ranged from "Not Supportive at All" to "Strongly Supportive". Rating is based on the results of the quantitative analysis. (3) 60 Total Points for Concrete Box Girder (2) 68 Total Points for Steel Arch Truss (1) 39 Total Points for Steel Flat Truss
Pop-Up Event held at the Los Gatos Creek Trail on April 25th, 2022. There were approximately 54 participants at this event. Participants placed stickers on a Project Board to show their level of support for each structure option. The total number of stickers placed on the Project Board were used to develop a quantitative analysis. Points ranging from -2 to 2 were given to each vote based on the level of support given to each option, which ranged from "Not Supportive at All" to "Strongly Supportive". Rating is based on the results of the quantitative analysis. (3) 50 Total Points for Steel Arch Truss (2) 52 Total Points for Steel Flat Truss (1) 16 Total Points for Concrete Box Girder
Pop-Up Event held at the Town's Spring Into Green Event on April 23rd, 2022. There were approximately 100 participants at this event. Participants placed stickers on a Project Board to show their level of support for each option. The total number of stickers placed on the Project Board were used to develop a quantitative analysis. Points ranging from -2 to 2 were given to each vote based on the level of support given to each option, which ranged from "Not Supportive at All" to "Strongly Supportive". Rating is based on the results of the quantitative analysis. (3) 136 Total Points for Steel Arch Truss (2) 86 Total Points for Steel Flat Truss (1) 9 Total Points for Concrete Box Girder
Online Survey posted on the Project's Website and advertise through the Town's Social Media platforms, Town's Weekly Newsletter, and Flyers. The Online Survey was open for three weeks, between Sept. 16th, 2022 to Oct. 7th, 2022. There were 266 participants. The Online Survey included questions that allowed participants to show their level of support for each structure option. The survey results were used to develop a quantitative analysis. Points ranging from -2 to 2 were given to each vote based on the level of support given to each option, which ranged from "Not Supportive at All" to "Strongly Supportive". Rating is based on the results of the quantitative analysis. (3) 177 Total Points for Concrete Box Girder (1) -85 Total Points for Steel Arch Truss and -67 Total Points for Steel Flat Truss

For additional Project information, please scan the QR Code or visit:
www.LosGatosCA.gov/Hwy17BPOC

ATTACHMENT 1

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