

June 3, 2020 OSBT motions

Curt Brown moved the Open Space Board of Trustees make the following statement to City Council in regard to the Flood Protection Level:

If Council ultimately chooses to proceed with the existing Variant I options, it appears that the 100-year flood protection option has the greatest flexibility for reducing or avoiding direct project impacts to the environment. Under any of the proposed versions of Variant I, it will be critical to both remove the CU South levee and to restore, including but not limited to, all 119 acres of OS-O land, as part of a comprehensive mitigation plan. This provides the best opportunity to reconnect those lands with the floodplain and to accomplish mitigation in the immediate project area, something that is always desirable, and in many cases, mandatory for regulatory compliance.

Dave Kuntz seconded. This motion passed unanimously.

Karen moved the Open Space Board of Trustees make the following statement to City Council in regard to upstream alternatives:

When the proposed Variant I US-36 floodwall was moved onto OSMP/State Natural Area critical habitat, the environmental impact of the project was dramatically increased, and Council requested feedback from OSBT on the revised project. On September 11, 2019, the Board provided detailed feedback including a request to take a new look at the Upstream Option as a possible means to avoid or reduce these new impacts. We are still looking for this requested side-by-side analysis/comparison.

On May 22, 2020, OSBT began receiving new information on the Upstream Option. This included a map (#B-1) of the South Boulder Creek 100-year Flood Flows indicating that two-thirds of the peak flow and more than one-half of the flood volume occurs west of South Boulder Creek and is only prevented from flowing into the CU South gravel pit by the existing levee. This raises the questions: Once the levee is removed (where the western flow encounters it), how much of this flow could be stored in the gravel pit via berms and excavation within the OS-O area? And, how would that reduce the Variant I storage and excavation requirements at the northern part of CU South (PK-U/O) and thereby reduce or eliminate the need for the US-36 floodwall?

OSBT will not vote on disposal until we have the answers to these questions, in addition to others in our 2018 and 2019 recommendations to Council. To get those answers, OSBT asks Council to direct the Utilities Department to, within the next few weeks:

Use existing mapping and data and work with two or more volunteer engineer/hydrologist professionals from the community to do model simulations to analyze what happens to the flood flows if the levee is breached and floodwater is stored in the gravel pit (see attachment),
Use results from the models to generate preliminary cost estimates for the modeled concept(s),
Work with OSMP to assess the environmental impacts, and then present the modeling, cost estimates, and environmental impact results to OSBT and the public, and

Enable OSBT to hold an open, data-based discussion and public hearing leading to the Board's final recommendation to Council regarding a 100-year Upstream Concept vs. the existing Variant I Concept.

Detention of 100-year flows on CU-South's OS-O land has the potential to: (1) reduce environmental impacts and thereby reduce the time and risk inherent in regulatory permitting; (2) limit intrusive construction to CU-South OS-O lands; (3) provide flexibility to detain larger than 100-year flows; and (4) improve cost effectiveness. With these potential benefits and the possibility of reducing the current \$66M to \$93M estimated probable construction costs, OSBT considers it prudent to take a month to answer these questions.

Initial List of Questions/Model Runs Requested by OSBT, based upon the information received May 29, 2020, to be revised through conversations with staff:

The principal objective is to determine what fraction of the 100-year flood could be stored upstream. As a starting point, there is no need to do cost estimating, detailed conceptual design, or to assess collateral impacts to environmental resources until it is demonstrated that a sufficient fraction of the flood might reasonably be stored away from US-36, allowing for significant changes in the Variant I scheme which would directly benefit OSMP resources or provide other enhancements to the project. These analyses will enable OSBT to host with staff and the public, a data-driven discussion of upstream options.

Use existing mapping, flow data, and flood models to analyze what happens to the flood flows shown in B-1 if the levee is removed:

The levee at the south end of the CU-South property is removed along with any levee outside the Dry Creek Ditch in that area.

The land in the vicinity of the removed levee(s) continues the downward slope toward the north found immediately to the South of the CU South and Dry Creek Ditch levees, encouraging flow into the gravel pits.

Develop staff's best concept for storing that flow in the gravel pit/OS-O using both existing and new structures and excavation to reasonably maximize storage. Only constrain storage above the 500-year flood elevation inside the levee.

Estimate the stored volume and how that storage reduces peak flows and volumes downstream. Using professional judgment, consider how those reductions could be translated into reduced impacts on OSMP lands.

Repeat these steps adding staff's best concept for directing a greater fraction of the westerly flow into the gravel pit using inlet excavation or a berm, or both. Extend the berm only south to the South Boulder Creek trail area.

If those assumed concepts have resulted in significant reductions to the Variant I adverse impacts on OSMP resources, proceed to characterize the key assumptions and vulnerabilities.

Characterize broadly the collateral consequences for OSMP resources incorporating information from the existing staff analysis. Proceed with staff and Board discussions, leading to the public forum.

If not, stop, and document analyses for a public forum.

Dave Kuntz seconded. This motion passed unanimously.

Curt Brown moved the Open Space Board of Trustees make the following statement to City Council in regard to implementation of an early warning system:

The Board supports the Utilities Department installing a flood early warning system for South Boulder Creek.

Dave Kuntz seconded. This motion passed unanimously.

The following motion was passed unanimously at the September 11, 2019 OSBT meeting

Tom Isaacson moved that the Open Space Board of Trustees communicate to City Council the following feedback regarding the South Boulder Creek Flood Mitigation Project. Curt Brown seconded. This motion passed four to zero; Hal Hallstein was absent for this meeting.

1. What is OSBT's view on whether the construction of a floodwall or other flood mitigation structures on Open Space (the proposal) would require a disposal?

Yes, because flood control to protect development in a floodplain is not an Open Space Charter purpose, among other reasons, this would require a disposal. If council has a different view, we would request the opportunity to discuss the matter, as it raises important questions regarding the Board's Charter responsibilities.

2. Does OSBT believe that its responsibilities inherently preclude it from making a disposal for "the proposal," even if the mitigation plan is expected to be highly effective?

Tom Isaacson, Curt Brown, and Dave Kuntz would answer this question "no." Karen Hollweg believes the question cannot be answered.

3. For OSBT to consider a disposal motion what information would OSBT first need?
 - a. A side-by-side analysis and comparison of the benefits and costs of the revised Variant I (that uses OSMP land, instead of CDOT land, for the floodwall) and an upstream option which would capture enough flow upstream and west of the CU-South property to eliminate the need for a floodwall to bedrock on OSMP land. That upstream variation would creatively and strategically place minimally invasive structures to guide the flood flows in one or more places west of Hwy 93 to Hwy 36.

- b. The engineering plans and modeling analyses to show that the historic underground flow will be maintained in the OSMP State Natural Area (especially in the 90 acres near Hwy 36) in wet, dry, and flood years, including the maintenance and operation of any structures proposed for doing this in perpetuity.
- c. Explanation of how the proposed flood mitigation structures will be designed and constructed to minimize impacts to OSMP lands and critical habitat.
- d. Identified mitigation of impacts to high quality ecosystems and listed species informed by conversations with the USFWS and USACE to determine ways of avoiding or minimizing adverse impacts to OSMP resources and listed species.

4. If the answer to #2 is other than “yes”:

A. What are the key elements of a mitigation plan that OSBT believes could support its approval of the revised Variant I?

The items identified in [the July 11, 2018 memo OSBT recommendation of mitigation measures](#) plus additional measures to offset the new impacts of construction of any flood mitigation structures on Open Space.

B. Are there any metrics/criteria that OSBT would recommend for evaluating such a mitigation plan?

- 1. Curt Brown, Karen Hollweg and Dave Kuntz would recommend a standard of net Open Space benefit; Tom Isaacson would not require that Open Space be net better off as a result of the mitigation plan
- 2. Approval of the mitigation plan by USFWS and USACE

C. Does OSBT have any feedback on the likely feasibility/effectiveness of such a mitigation plan in achieving its goals?

In-kind mitigation (creation of similar habitats elsewhere for these specific listed species) for loss of this type of riparian and wet meadow habitats has proven to be extremely difficult and to date has not been possible for spiranthes in particular. Sufficiency of out-of-kind mitigation is a complex judgment that will require input from both city/OSMP staff and FWS/USACE.

5. Does OSBT have any feedback on potential means of avoidance, i.e., ways to lessen the ecological impact of the revised Variant I project?
 - a. A dam design that places most or all of the foundation underneath and downstream of the main flood wall.
 - b. A foundation design that is inherently less obstructive to GW movement, e.g., a pier/caisson design rather than a typical cutoff wall to bedrock.
 - c. A robust groundwater maintenance and monitoring system.
 - d. A design for the dam and monitoring system that put most or all inspection access behind the structure.
 - e. A construction process specifically designed to minimize upstream OSMP impacts, e.g., excavating, transporting, staging and constructing from within the floodwall footprint or the downstream side.
 - f. For other project designs similar approaches should be considered.

6. Does OSBT have any feedback regarding the value (from an Open Space perspective) of pursuing a version of Variant I with less-than-500-year flood protection?
 - a. The maximum depth and area of OSMP land that is ever inundated would be reduced. However, these reductions will be occurring for the lowest probability events, so those gains will be modest.
 - b. The amount of OS-O land that the University may desire for development would be reduced, potentially freeing up some additional

OS-O land for mitigation. However, this land is the highest and driest of the OS-O and therefore may be of more value as buffer lands rather than compensatory habitat.

7. Does OSBT have any feedback regarding the value (from an Open Space perspective) of pursuing a version of an upstream option with less-than-500-year flood protection?

Reducing the level of flood protection should also be considered for an upstream design.

8. With respect to regulatory permitting, i.e., by regulatory agencies in response to the submission of a mitigation plan:

OSBT believes that obtaining regulatory approval presents a significant challenge and it is valuable to begin discussions with regulatory agencies sooner rather than later.

9. Does OSBT have any feedback on whether to pursue further evaluation of Variant II (whether 100 or 500) at this time?

OSBT does not recommend pursuing Variant II at this time.

OSBT Recommendation to Council made on July 11, 2018

- (1) Karen Hollweg moved the Open Space Board of Trustees recommend that City Council advance one or both of the following South Boulder Creek flood mitigation 100 or 500-year concepts to preliminary design: 1) Variant 1 and/or 2) Variant 2. These recommendations are conditioned on the terms shown in Attachment A, as revised. Curt Brown seconded. This motion passed four to zero; Kevin Bracy Knight was absent.

Revised Attachment A

Attachment A: Recommended Concept Advancement Terms

Variant 1 and Variant 2 (100-Year or 500-Year Facility) Concepts

The following terms are recommended in order to advance all concepts.

1. Remove the CU levee and restore underlying land as part of project design at project cost.
2. OSMP and Public Works staff continue to work collaboratively to avoid and minimize city open space impacts (e.g., flooding, structures, vegetative damage, introduction of potentially damaging species) throughout preliminary design and construction.
3. OSMP and Public Works staff develop additional information through preliminary design, to both staffs' satisfaction, on projected sedimentation, groundwater flow, debris accumulation, and required vegetative maintenance on city open space in order to identify and clarify additional mitigation and compensation measures.
4. OSMP and Public Works staff conduct a review and assessment of 30%, 60%, and 90% design plans to ensure that all open space concerns are getting addressed and return to OSBT for their input at each stage before advancement through preliminary design to construction.
5. Criticality of Groundwater Conveyance: All proposed flood control variants include a floodwall along US-36 with a foundation to bedrock, as required by the State Engineer. This wall, however designed, has the potential to intercept the flow of ground water that supports critical wet meadow ecosystems above and below the highway. These ecosystems provide habitat for two listed species and are one of the rarest ecotypes in Boulder County and the state.

Impacts to wet meadows from short-term, infrequent inundation can be compensated by enhancement of adjacent lands. However, permanent degradation of the wet meadow ecosystem due to disruption of the underlying groundwater regime cannot be compensated or offset by anything other than additional mature wet meadows, which simply cannot be created using the higher, mined lands of CU South. Creation of new wet meadow habitat, particularly in an arid region, has proven so far to be impossible to accomplish at any price and over long time frames. Compensation for this risk is simply not possible; hence, it must be avoided.

Therefore, just as the mechanical outlet works are essential to the functioning of this flood control project, so also must the proposed groundwater conveyance system work fully for as long as the floodwall is in place. As with the outlet works, it must be tested, operated, maintained and as necessary replaced to ensure its full functioning continuously in perpetuity. The project plan, SOP, and long-term budget must be developed to achieve this goal, based upon previous experience with similar systems.

6. In order that the project results in clear net benefits for open space, acquire portions of CU South OS-O property and water rights in Dry Creek Ditch #2 for permanent OSMP ownership and management, as follows:
 - a. Convey approximately 40 acres of land to the west and north of the CU levee as part of the project.
 - b. Provide project funding to restore three acres for each additional acre of OSMP land subject to ponding under the 100-year storm event with the

constructed project, not to exceed \$100,000 per acre. Based upon current project estimates:

Variant 1: 17.4 acres restored at approximately \$1.74 million.

For Variant 2: 47 acres restored at approximately \$4.7 million.

c. Incorporate realignment of the Dry Creek Ditch #2 west of the restoration area to the extent practical and acceptable to the ditch board and CU and convey sufficient water rights in Dry Creek Ditch #2 to support the restoration goals in 6b;

7. In order to consolidate management of the South Boulder Creek floodplain lands, acquire and convey to OSMP the 44 acres of CU South lands between the existing CU levee and OSMP lands to the east and south, with subsequent management and any restoration to be funded by OSMP.

8. Public Works Department supports OSMP efforts through annexation to convey and/or permanently protect CU South's remaining OS-O acreage to the west and north of the CU levee for long-term protection and possible restoration (approximately 35 acres).

9. Develop and implement a Monitoring and Maintenance Agreement between OSMP and Public Works to address long-term needs to keep the project functional and within design parameters.

Two additional mitigation elements would be implemented under Variant 2

10. Modify or realign the city's sanitary sewer that runs along South Boulder Creek to allow for OSMP projects to open up the floodplain, as part of preliminary design and construction.

11. Provide for enhanced wildlife passage under US36 beyond current concepts as part of preliminary design and construction.

(2) Karen Hollweg moved that the Open Space Board of Trustees state that, while both variants have impacts to Open Space, the preferred option is Variant 1 based on Open Space values. Variant 2 is less desirable because it would impact Open Space and Mountain Parks resources of higher significance and on a more frequent and long-term basis. Curt Brown seconded. This motion passed four to zero; Kevin Bracy Knight was absent.

(3) Karen Hollweg moved that the Open Space Board of Trustees recommend that City Council request development of an upstream storage concept design that could work separately or in concert with Variant 1 and/or 2. Principal objectives would include enabling the flood wall along US 36 to be removed, reducing the sedimentation and inundation impacts on Open Space and Mountain Parks lands, avoiding the need for a

flow restriction at the US 36 bridge, minimizing other impacts on Open Space and Mountain Parks lands, and taking account of the project's permit-ability. Curt Brown seconded. This motion passed four to zero; Kevin Bracy Knight was absent.

- (4) Andria Bilich moved that the Open Space Board of Trustees state that, "the Open Space Board of Trustees has a significant interest in the future of the OS-O portion of the CU South property and how this area may impact existing city open space and how this acreage may further city open space purposes and services. Therefore, OSBT requests that City Council seek OSBT input, at such a time deemed appropriate during annexation negotiations with CU, regarding decisions affecting the future of any of the land on CU South property with OS-O land use designation. Curt Brown seconded. This motion passed four to zero; Kevin Bracy Knight was absent.

- (5) Curt Brown moved that the Open Space Board of Trustees make the following statement regarding Groundwater Conveyance: Critical wet meadow habitat upstream and downstream of US-36 depends upon uninterrupted groundwater flow. Loss of this rare ecotype due to groundwater disruption would not be acceptable under the OSMP Charter. To date, creation of new, compensatory, wet meadow habitat, particularly in an arid region, has proven impossible to accomplish at any price and over long time frames. Therefore, full and continuous functioning of a robust groundwater conveyance system in perpetuity is a critical component of any flood control variant, as detailed in Attachment A. We also judge that this clear commitment to successful operation of the groundwater conveyance system in perpetuity will be critical to obtaining environmental permitting for the project. Andria Bilich seconded. This motion passed four to zero; Kevin Bracy Knight was absent.

- (6) Tom Isaacson moved that the Open Space Board of Trustees make the following statement, "The proposed flood mitigation concepts raise important and potentially complex disposal issues under section 177 of the City Charter, with respect to storage of flood waters on Open Space land, the construction of flood detention facilities, or both. Those issues include (1) whether the concept would require a disposal, (2) whether a disposal should be approved, and (3) the detailed terms of any such disposal. OSBT believes that the disposal issues are best addressed after the number of concepts has been narrowed and the preferred concept(s) have been more fully designed and specified. In the event that one or more concepts proceed to preliminary design, OSBT intends to work with city staff to identify the point in the process at which such concept(s) have been sufficiently designed and specified such that OSBT can then make a fully-informed

decision on any disposal questions. Karen seconded. This motion passed four to zero; Kevin Bracy Knight was absent.