

## PLAN NARRATIVE

### Superior Town Center FDP 1 Phase 10 (Marshall Road Bridge)

April 28, 2020

#### NARRATIVE RATIONALE / DESCRIPTION OF THE PROPOSAL

##### A. Scope of the Project

This **Final Development Plan 1 Phase 10 (hereafter referenced in combination as the “FDP”)** is for development of the Marshall Road bridge over Coal Creek. The FDP is within Planning Area 1 of the *Superior Town Center* (Preliminary Development Plan Amendment #PD-A-2013-1 approved August 20, 2013)

The notable improvements included in the project scope for these FDP’s are:

- 1) Bridge: The bridge consists of a 90-foot single-span bridge that will be constructed over Coal Creek with concrete abutment walls.
- 2) Marshall Road: Completion of Marshall Road from the current dead-end stub near the Element Hotel to the north side of Block 4. Marshall Road from Main Street to the north side of Block 4 was approved as part of FDP1 Phase 9.
- 3) Temporary Facilities: Temporary facilities to be located within this FDP will include stormwater management Best Management Practices (e.g. silt fence etc.) and limited contractor staging areas. Details of these items are beyond the scope of an FDP and will be depicted on construction plans.
- 4) Pedestrian Circulation: Pedestrian circulation is provided along both sides of Marshall Road via sidewalks. The sidewalks are detached (with a tree lawn) north and south of the bridge. Sidewalks are attached (immediately adjacent to the roadway curb) on the bridge itself. A stairway will be constructed at the southeast corner of the bridge to provide pedestrian access from the west side of the bridge to walkways in Park 1.
- 5) Utility Infrastructure: Most of the public utility infrastructure to serve this perimeter of this project is included in separate FDP’s; specifically, FDP 1 Phase 4 and subsequent Town projects related to Tesla. This infrastructure is constructed as of March 2020.
- 6) Plat: No accompanying Plat is required for this FDP. A platted right-of-way exists for Marshall Road. Portions of the sidewalks along Marshall Road will extend beyond the right-of-way into the adjacent Town owned Tracts.

##### B. Principal Features and Attributes

1. The principal visible features for this FDP is the bridge, and associated retaining walls.
2. Marshall Road: The overall horizontal centerline alignment of Marshall Road was designed from McCaslin Boulevard to Creek View Way as part of earlier FDP’s. The centerline alignment of this portion of Marshall Road is consistent with the overall plan. Marshall Road will include one vehicular travel land and one bicycle lane in each direction.

**C. Conformance with the Previously Approved Plans**

**1) PD**

The PD contemplated Marshall Road crossing Coal Creek, but did not establish the cross section, span, or exact location. The Design Guidelines did not address the appearance of the bridge.

*Request for deviation from PD:* The PD included a cross section of Marshall Road north of Creek View Way (section 4 on SP4.0a of PDA3). This section depicted a 36 foot flowline/flowline dimension with a 7 foot tree lawn and 5 foot sidewalk. Both this FDP and the approved FDP 1 Phase 9 depict a narrower street (32 feet) and wider sidewalks. This change was made to maximize the space available for pedestrians, particularly across the bridge, without changing number of traffic lanes.

**2) FDP 1 Phase 4 (Marshall Road) and FDP 1 Phase 9 (Morgan Ranch Infrastructure)**

The cross section, horizontal alignment, and profile matches those of previously approved FDP's at tie ins.

**3) FDP 1 Phase 5 (Coal Creek improvements)**

FDP 1 Phase 5 included relocation of Coal Creek and extensive hydraulic modeling of the floodplain. The design established the location and required clear span of the Marshall Road bridge. FDP 1 Phase 10 is consistent with FDP 1 Phase 5 with respect to these parameters.

**4) FDP 1 Phase 6 (Parks 1 and 2)**

FDP 1 Phase 6 depicted the location of location and clear span of the bridge as recommended in FDP 1 Phase 5. FDP 1 Phase 6 also illustrated the location of pathways and stairs connecting Marshall Road to the Parks.

**5) Request for deviation from FDP 1 Phase 6 and Park Master Plan:**

The Park Master Plan showed pedestrian connections from Marshall Road to the Parks on the northwest, southwest, southeast and northeast sides of Marshall Road. FDP 1 Phase 10 does not accommodate a connection at the northeast corner, as depicted on the Master Plan. The Town's project to enlarge a water quality pond south of the Element hotel makes construction of a pedestrian connection at this location infeasible. This pond was enlarged to accommodate the Tesla project.

FDP 1 Phase 6 depicted stairs on the east side of the south bridge abutment. The Master Plan depicted stairs both sides of the south bridge abutment. FDP 1 Phase 10 proposes stairs on the west side only. In the Master Plan, the stairs on the east side of the abutment provided a redundant, non-accessible connection from Marshall Road down to the park. In an effort expand landscape opportunities and reduce complexity, cost, long term maintenance of the Park, FDP 1 Phase 10 does not propose stairs on the east side. While these stairs on the west side of the bridge are part of the Park project, they are structurally related to the bridge abutment/wingwall and therefore will be constructed with the bridge and are included in this FDP.

#### **D. Structural Design Approach**

1. Overview: A new 90-foot single-span bridge will be constructed over Coal Creek. The horizontal and vertical alignments were established through the civil design. The bridge will accommodate two (2) 1'-6" wide bridge rails, two (2) 7'-6" wide sidewalks, two (2) 5'-0" wide shoulders/bike lanes, and two (2) 11'-0" wide travel lanes for a total width of 50'-0". The bridge follows a tangent horizontal alignment with a normal crown at the centerline of the road.
2. Superstructure: The bridge superstructure will consist of 31" deep prestressed concrete box girders placed side-by-side with a 5" composite concrete deck, a waterproofing membrane and 3" of hot mixed asphalt. The bridge structure depth has been carefully evaluated to maximize the hydraulic opening and minimize the required embankment height. Utilizing side-by-side box beams allows for a thin superstructure as opposed to deep, widely spaced beams.
3. Bridge Railing: It is desired to incorporate a 7'-6" wide raised sidewalk with an exterior bridge rail on the either side of the structure. The bridge rail must meet crash test criteria and provide adequate pedestrian safety measures. To meet these objectives, a CDOT Type 10M bridge rail, modified for pedestrian use is proposed. This railing economically provides an open system to facilitate viewing opportunities of Coal Creek and the proposed park below.
4. Engineering Geology: A geotechnical investigation encountered claystone bedrock at depths between approximately 6-20 feet. This investigation included a structural boring (B-5) north of Coal Creek as well as a structural boring (B-6) south of Coal Creek. In structural boring B-5, claystone was encountered at approximately 7 feet with hard claystone encountered at 10 feet. In structural boring B-6, medium claystone was encountered at approximately 10 feet with hard claystone encountered around 15 feet. The site conditions favor semi-integral wall-type abutments supported by caissons. Additionally, mechanically stabilized backfill will be utilized to reduce the lateral forces experienced on the abutments and wingwalls. Approach slabs are recommended to eliminate the bump that often occurs at the bridge abutments due to settlement of the approach embankment.
5. Utilities: There are no utilities currently scheduled to be carried on the bridge. Dry utilities desiring to be carried by the bridge would best be accommodated within the sidewalks on either side and would not affect the structure.
6. Aesthetics: Close coordination with the landscape architect and the civil engineer has been maintained in order to provide a high level of aesthetics on the bridge. The turnback wingwalls will incorporate brick facing with a concrete core for structural purposes. The wingwalls are detached from the bridge abutments and are supported by caissons. Additionally, each wingwall begins and terminates with brick-faced concrete pilasters.

#### **E. Trails**

The Coal Creek Trail currently runs adjacent to the north of Coal Creek, and this trail will be maintained. Additionally, a new trail system is proposed to the south of Coal Creek. It is desired to facilitate an underpass for each trail to avoid interruptions or road crossings at the bridge.

## **F. Architecture**

The bridge structure includes aesthetic detailing on all four sides of the Marshall Road underpass, adjacent to Coal Creek. Coal Creek is flanked by a brick monument structure on each side that mirrors the timeless and clean brick articulation and steel detailing included in the future Main Street commercial development. These monuments will serve as a marker along the Coal Creek regional trail and a backdrop to Parks 1 and 2. Wayfinding such as “Marshall Road” lettering above the trail and “To Main Street” will be included on this structure. The “Downtown Superior” white logo will be included on the northwest and southeast faces and is expected to serve as a photogenic placemaking element. The abutment walls, largely hidden by landscaping and grade will be formed concrete with simple, elegant scoring. The brick structure will be lit on all four sides and underneath. Festoon lighting tucked on the back side of the top guardrail is also proposed to provide a festive feeling (refer to Sheets L9.0 and L9.4). The lighting system will be encased in a metal channel and set on the back side of the guardrail for protection. The underpass walls will allow for future art opportunities by the Town of Superior CAPS committee. While on top of the bridge structure itself, cars, pedestrians, and cyclists will be greeted by planter pots (planted with annuals in warm months and decorated in the winter season (by the Town or Town committee)) sitting atop the eight columns. The guardrail will be a timeless and modern black steel 3-rail system that also meets crash barrier requirements. Refer to Sheet L9.0 for 3D renderings.

## **G. Marshall Road – Roadway**

South of the bridge, the street is 32 feet flowline/flowline. This provides for one vehicular travel lane and one bicycle lane in each direction, and on street parking on both sides of the street. The cross section dimension and lane configuration is consistent with FDP1 Phase 9 for Marshall Road north of Creek View Way.

North of the bridge, the street transitions from 32 feet flowline/flowline to approximately 60 feet wide at the connection to the existing Marshall Road stub. The additional width is allocated to a painted median between the vehicular lanes. The painted median aligns with the existing raised landscape median north/west of the Element Hotel.

The profile of the roadway provides for a minimum 1% centerline grade per Town engineering standards. The roadway slopes up from the tie in at the Element hotel to the center of the bridge, and then slopes down towards Creek View Way. A vertical curve is proposed on the bridge itself, which is easily accommodated by the structural camber of the underlying bridge girders.

All applicable Town and AASHTO roadway design standards will be met. Guardrails ends at the bridge abutment are located a minimum of 17.5 feet horizontally from the vehicular travel lane. This will place the rail ends outside the AASHTO suggested side the clear zone distance. Crash attenuators are not required for rails outside the clear zone. This is consistent with other bridges in Town. The design speed for the roadway is 30 MPH.

Striping and signage for the Streets will be per standard Manual and Uniform Traffic Control Devices.

Paving materials and finishes comply with Section 4.6 and Appendix D of the Design Guidelines. All the sidewalks included in FDP will be constructed with standard, natural color concrete. Marshall Road, including the bridge deck, will be paved with asphalt.

#### **H. Landscape Plan and Aesthetics**

The Landscape Plans for the street rights-of-ways follow the aesthetic already defined throughout Superior Town Center and continue the existing landscape on Marshall Road (adjacent to Tesla and the hotel) and coordinate with the future landscape just north of Creek View Way. The plan is primarily composed of low-water-use plant species. The concept aims to maximize color throughout the seasons. Evergreen shrubs such as creeping cotoneaster are accented with roses, ornamental grasses, and showy perennials. The plan alternates turf tree lawns with shrub tree lawns in an articulation that matches the rest of the development. All requirements have been exceeded. The landscaping within Parks 1 and 2 (per a separate FDP) shall accent the bridge structure and the park design will be coordinated with this FDP.

#### **I. Fencing and Guardrails**

The block retaining wall on the east side of Marshall Road north of the bridge will have a black powder coated ornamental metal fence on the top of the wall. This fence will be selected to match the existing metal fence around the adjacent Town owned water quality pond.

The guardrails on top of the bridge and bridge abutments will be a black steel ornamental 3-rail system attached to the concrete bridge structure. These guardrails have been designed (both in plan and elevation) to meet all crash barrier requirements. The finish on the guardrails and bridge caps will match.

#### **J. Exterior Lighting Approach**

The primary goal of exterior lighting is to facilitate vision and enable people to identify hazards or threats. A quality lighting design will provide illumination of key features and landmarks to improve guidance and wayfinding through the area, while maintaining a dark sky friendly approach consistent with the Superior Town Center (STC) Design Guidelines. Additionally, the lighting design will add visual interest and a unifying streetscape element to the neighborhoods.

Key lighting design considerations for exterior lighting are glare control, color rendering, contrast, and energy efficiency. Prime consideration will be given to those luminaires that produce warm, inviting light with little or no glare. Light sources with a high color rendering index are preferred because they will help colors appear truer at night. Solid-state light sources (LED) will be used throughout because they are well known for their energy efficiency and long life.

##### **1) Roadway**

The primary lighting strategy is to illuminate the drive lanes from Xcel pole mounted streetlights, continuing the existing Marshall Road pattern. The color temperature for all streetlights shall be 3000K. Pedestrian crossings and drive lane intersections are prioritized to improve visibility. This luminaire is to be full-cutoff to minimize light pollution. Xcel poles allow proper illumination of the bridge structure (given the dimensions – which were set by Urban Drainage) and allow for fewer lights and more trees than a shorter pole. The smaller pedestrian poles that exist on site will begin at Creek View Way per the Design Guidelines.

Roadway luminance values will conform to Illuminating Engineering Society's (IES) guidelines to provide adequate visibility and create a sense of safety.

## **2) Walkways**

Pedestrian scale pole mounted luminaires will be provided at the stairway (designed and placed with Parks 1 and 2) and vandal resistant luminaires used over the multi-use path under the bridge. Lighting is to be scaled to pedestrians, provide wayfinding, and enhance the perception of safety. The color temperature for all walkway luminaires shall be 3000K.

The maximum horizontal and vertical illuminance (measured in foot-candles) on the walkways will conform to Illuminating Engineering Society's (IES) guidelines to provide adequate visibility and create a sense of safety. There are no maximum illuminance values prescribed in the STC Design Guide or the Town of Superior Land Use Code, Sec. 16.

## **3) Decorative Lighting**

The bridge rail will house miniature points of light to create a decorative sparkle effect without creating glare or distractions for drivers. Landscape features will be high-lighted with durable grade-mounted well shielded accent-lights. The accent-lights will be directed and locked at specific landscape features.

All decorative light sources will be 3000K CCT.

## **K. Parking**

This FDP does not include any parking.

## **L. Signage**

Street signage will include no parking and other standard traffic signs.

## **M. Materials Boards**

Refer to Sheet L9.0-L9.4 for bridge aesthetic renderings and materials. Materials are comprised of timeless materials. The palette will mirror that within the Main Street commercial core and will consist of decorative brick columns with black steel caps and white lettering that matches the logos/style included on the existing Downtown Superior entry signage.

## **N. Snow Removal**

Snow removal for this FDP will be the same as any standard Town street and is anticipated to be provided by the Town. Snow plows will spread snow to the gutter of Marshall Road. Additional snow removal effort by manual methods or a 4-wheeler will be required to clear the adjacent sidewalks. Snow removal from the stairway west of the bridge will need to be done using manual methods. Because the sidewalks and stairs are adjacent to Town or contained within Ton owned land (Parks 1 and 2), it is anticipated that the Town will be responsible for removal of snow on the walks.

**O. Traffic Study**

This FDP will not generate any traffic. The project will complete Marshall Road from McCaslin Boulevard to Creek View Way and provide one of the critical project entrances as identified in the PD.

**P. Mail**

This FDP does not involve any mail.

**Q. CONSTRUCTION PHASING**

All infrastructure associated with this FDP will be constructed as a single phase. The construction zone will be accessed from both the north and south sides of the creek. Special considerations for detouring the Coal Creek path will be required while setting the bridge girders and constructing the bridge deck.

**R. Utilities**

**1) Storm Drainage**

Infrastructure to collect runoff from the bridge and north side of Marshall Road was constructed as part of FDP1 Phase 4. This infrastructure included two stormwater inlets just north of the Element hotel driveway. As built grades of the element driveway apron prevent all flow from reaching the existing inlet on the northeast side of Marshall Road, so one additional inlet will be constructed as part of this FDP. Runoff collected by the new and existing inlets is conveyed via existing piping to the existing Town owned water quality pond south of the Element hotel.

Drainage from the south side of Marshall Road will flow south to a pair of inlets at the corner of Marshall Road and Creek View. These inlets will be installed as part of FDP 1 Phase 9. These inlets were sized to accommodate the anticipated flows from the bridge project. Runoff collected by these inlets is conveyed to Pond 311.

**2) Dry Utilities:**

Final design of dry utilities gas and electric will be coordinated with Xcel, and the locations of transformers, electric mains and gas mains is depicted on the utility plans.

**S. Irrigation**

The irrigation system on north side of bridge will be connected to a 1.5" mainline connection from future park system. The south side of the bridge will be connected to a 1" tap, booster pump and 2" mainline installed in Phase 9. The water source will be non-potable city water and a booster pump will be required to be installed for this phase. Irrigation service will be metered, and water will be paid for by the Town of Superior.

All visible irrigation equipment will be purple in color to indicate non-potable, per state requirements (all sprinkler heads, valve boxes, quick coupler valves. This irrigation will be connected to a 2-wire controller that was installed in future park or Phase 9 installations. The turf areas will use a combination of pop-up sprays on areas 25' or less. Shrub beds will

use low volume drip irrigation for the plant material and the street trees will use low volume deep root bubbler systems. The system will be zoned such that different plant materials, exposures and elevation will be considered and will be irrigated on separate zones. The planter pots on top of the columns will have permanent irrigation, hidden from view. This irrigation will be detailed, designed, and coordinated with the bridge structure and planter pots once general concept approval is provided by the Town.