



MEMO

- Overnight
 Regular Mail
 Hand Delivery
 Other: _____

| | |
|-------------------|---|
| To: | Dana Hornkohl, PE |
| From: | Chris Rolling, PE Jenna Friesen |
| RE: | Transportation Capital Improvements (TCI) Methodology Dashboard Standard Operating Procedure (SOP) |
| Date: | May 20, 2025 |
| Project #: | City Proj. No. 9444-WO-Olsson-TCIP Olsson Proj. No. F21-06642 |

Introduction

The Fort Collins Transportation Capital Improvements (TCI) consolidates multiple city transportation plans into a unified list. This involves creating capital projects, developing performance-based scoring criteria, and integrating them into a fiscally constrained ten-year plan using a GIS-based dashboard. TCI is grounded in community objectives such as traffic safety, active transportation, emission reduction, support for community centers, and enhanced resiliency and sustainability, aligning projects with community goals and federal requirements.

This technical memorandum summarizes the methodology and Standard Operating Procedure (SOP) document for a Geographic Information System (GIS) based project management dashboard which supports the TCI process. This document provides a comprehensive guide to processes and tools, ensuring consistency in development and management of capital projects. It describes processes to develop the Project List, Scoring and Background GIS Layers, Scoring Rubric, and the interactive features of the GIS dashboard. The memo includes the following main topics.

- Project List
- Scoring and Background GIS Layers
- Scoring Process
- Dashboard & Functionality
- Use Cases

Project List

The Project List was compiled using projects listed in the Active Modes Plan (AMP), Transportation Capital Project Prioritization Study (TCPPS), Highway Safety Improvement Program (HSIP) Funding Awards, proposed at-grade crossings from the Strategic Trails Master Plan, and the list of bridge improvements from the City. Once all these projects were compiled, Olsson “grouped” projects by geographic location and by proposed project type. Once projects were grouped, these became known as the “TCI” Project and were assigned an associated TCI number (e.g. TCI-001, TCI-002, etc.). These projects were mapped in GIS and kept in an Excel spreadsheet with the TCI Project numbers and additional project details such as location, scope, project types, cost, and status.

Scoring and GIS Layers

To establish a prioritization process, six scoring categories were developed which included: greenhouse gas reduction, safety, health equity index, community benefit, regional significance, and synergy. Each of these categories included one if, not multiple GIS layers to use in the scoring process. Those layers are listed in the **Table 1**. These data layers were used in the scoring process which was completed in GIS using a combination of manual scoring and geospatially using intersect analysis.

| Category | Dataset | Format | Source |
|---------------------------------|---|-----------------------|--|
| Greenhouse Gas Reduction | City Bus Routes and Stops | Spatial (shapefile) | Fort Collins GIS |
| Greenhouse Gas Reduction | 2045 Regional Significant Transit Corridors | Spatial (shapefile) | North Front Range MPO |
| | | | |
| Safety | LOSS Intersections | Spatial (shapefile) | Fort Collins 2022 Annual Roadway Safety Report (PDF) |
| Safety | High Injury Network | Spatial (shapefile) | Fort Collins GIS |
| Equity | Health Equity Index | Spatial (shapefile) | Fort Collins GIS |
| Regional Significance | 2045 Regional Significant Corridors | Spatial (shapefile) | North Front Range MPO |
| Community Benefit | Bike Scores | Spatial (shapefile) | Fort Collins 15-minute City Plan |
| Community Benefit | Pedestrian Scores | Spatial (shapefile) | Fort Collins 15-minute City Plan |
| Synergy | Street Maintenance Efforts | Spatial (shapefile) | Fort Collins Streets Maintenance Program |
| Synergy | Known Utility Projects | Spatial (shapefile) | Fort Collins GIS |
| Synergy | Forestry Land Cover Metrics | Spatial (geodatabase) | Fort Collins GIS |
| Synergy | Project Coordination Projects | Spatial (shapefile) | Fort Collins GIS |

TABLE 1 – SCORING CRITERIA DATA SUMMARY

Scoring Process

The primary method when scoring the TCI projects was using the intersect analysis geospatial processing method, which is used to determine the common areas between different spatial datasets. Essentially, it overlays multiple layers of geographic information to identify where they overlap. In this process, the TCI Projects layer overlaid all the scoring layers listed in the table, and assigned a value based on the overlap. If a project overlapped a scoring layer, the scoring criteria was then applied to the TCI Project. The scoring criteria can be found in the tables below.

| GHG Reduction | | | |
|---|--------------------------------------|--|-------|
| Does the project support vehicle electrification? | Does the project connect to transit? | Does the project support active modes? | Score |
| No | No | No | 1 |
| Yes | No | No | 2 |
| No | No | Yes | 3 |
| No | Yes | No | 3 |
| No | Yes | Yes | 4 |
| Yes | Yes | Yes | 5 |

TABLE 2 – GHG REDUCTION SCORING RUBRIC

The greenhouse gas reduction category was analyzed using spatial information such as transit routes and bus stops as well as active mode information to determine its score. If a project intersected a transit route or was within a short distance of a transit stop, then it would score higher. Additionally, if the Project’s description had an indicator that it would support vehicle electrification, then it was scored accordingly.

| Safety | |
|--------------------------------|-------|
| Safety Elements | Score |
| Not HIN or FI LOSS 3 or 4 | 1 |
| Not on HIN, but FI/LOSS 3 or 4 | 2 |
| On HIN | 3 |
| On HIN and FI LOSS 3 | 4 |
| On HIN and FI LOSS 4 | 5 |

TABLE 3 – SAFETY SCORING RUBRIC

The safety score was determined using the city’s High Injury Network (HIN) as well as the Level of Safety Service (LOSS) at the top 50 intersections identified in the Fort Collins 2022 Safety Report. As indicated in the Safety Scoring table, if a project is along the HIN or near an intersection with LOSS 3 or 4, or a combination of these layers, the score reflects the Project’s relation to those safety concerns.

EXHIBIT A TO RESOLUTION 2025-061

| Health Equity Index | | |
|---------------------|------------|-------|
| Low Range | High Range | Score |
| 0 | 60 | 1 |
| 61 | 75 | 2 |
| 76 | 90 | 3 |
| 91 | 95 | 4 |
| 96 | 100 | 5 |

TABLE 4 – EQUITY SCORING RUBRIC

Health Equity was scored using the City’s Health Equity Index. Each census tract is given a HEI score (HEI score in attribute table). When a Project intersected the HEI layer, the TCI score would be determined based on the intersection of the HEI score (e.g. TCI-057 intersects an HEI score of 54, therefore it gets a TCI score of 1). Note: if a Project intersected multiple HEI zones, the highest HEI score will determine the TCI Project score (e.g. TCI-001 intersects HEI scores of 15, 54, 92, and 100. This TCI project will get a score of 5).

| Regional Significance/Alignment | |
|--|-------|
| Alignment | Score |
| Not along a regional significant route | 1 |
| Partially along a regional significant route | 3 |
| Along a regional significant route | 5 |

TABLE 5 – REGIONAL SIGNIFICANCE SCORING RUBRIC

The Regional Significance and Alignment layers were analyzed manually by reviewing each TCI Project and seeing if the project or a portion of the project was along a 2045 Regional Corridor identified by the North Front Range MPO.

| Community Benefit | | |
|-------------------------|-----------|-------|
| Walking & Biking Scores | Rating | Score |
| 0-35 | Very Poor | 1 |
| 36-60 | Poor | 2 |
| 61-80 | Fair | 3 |
| 81-90 | Good | 4 |
| 91-100 | Very Good | 5 |

TABLE 6 – COMMUNITY BENEFIT SCORING RUBRIC

The Community Benefit Scores were scoring using the geospatial intersect analysis method and determining the Project’s score based on the bike or pedestrian’s layer’s score from the 15-minute City Plan. Like the HEI score, if the Project intersected multiple bike or pedestrian scores, the highest bike or pedestrian score was used for the TCI score (e.g. TCI-001 intersected 13 different bike scores, and the highest bike score in that intersect was 77.8, therefore the TCI-001 scored a 3 in the Bike Community Benefit category).

EXHIBIT A TO RESOLUTION 2025-061

| Synergy (Streets, Utilities, Other Projects) | |
|--|-------|
| Value | Score |
| Not aligned with other projects. | 1 |
| - | - |
| Partially aligned with other projects | 3 |
| - | - |
| Aligned with other projects | 5 |

TABLE 7 – SYNERGY (STREETS, UTILITIES, OTHER PROJECTS) SCORING RUBRIC

| Synergy (Forestry) | |
|--------------------|-------|
| Value | Score |
| 0 -10 | 5 |
| 11 - 20 | 4 |
| 21 - 30 | 3 |
| 31- 40 | 2 |
| 41+ | 1 |

TABLE 8 – SYNERGY (FORESTRY) SCORING RUBRIC

Synergy was scored using the Street Maintenance, Project Coordination, and Urban Forestry layers provided by the City. The Street maintenance and Project Coordination layers showed the locations of upcoming street maintenance as well as various projects listed by department and company throughout the city. The Project Coordination layer was reduced to City projects that intersected the TCI Projects GIS layer and then those projects were categorized as street projects, utility, projects, or other projects. The Synergy Streets score was determined based on the TCI Projects’ alignment with the Street Maintenance layer, while the Synergy Utilities and Synergy Other categories were scored based on the TCI Projects’ alignment with the Project Coordination layer. The Synergy Forestry category was scored with the Urban Forestry layer’s canopy percent. The TCI Project layer was intersected with the Forestry layer and scored based on the percentage of canopy coverage. The higher score indicates the need for increased tree canopy for an area. (e.g. TCI-001 intersecting canopy coverage percentages ranging from 20 to 37 percent, therefore receiving a score of 2).

Once all the scoring analysis is completed, scores are recorded in the TCI Project spreadsheet under each category. A weighting was applied to the scores which is designed to create a project list that emphasize the criteria that directly reflect community’s needs and values. The weighting scheme, designed to create a maximum score of 100, is shown in **Table 9** below.

| Safety | GHG | HEI | Regional | Synergy (Streets) | Synergy (Utilities) | Synergy (Forestry) | Synergy (Other) | Community (Bike) | Community (Pedestrian) |
|--------|-----|-----|----------|-------------------|---------------------|--------------------|-----------------|------------------|------------------------|
| 3 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 3 | 3 |

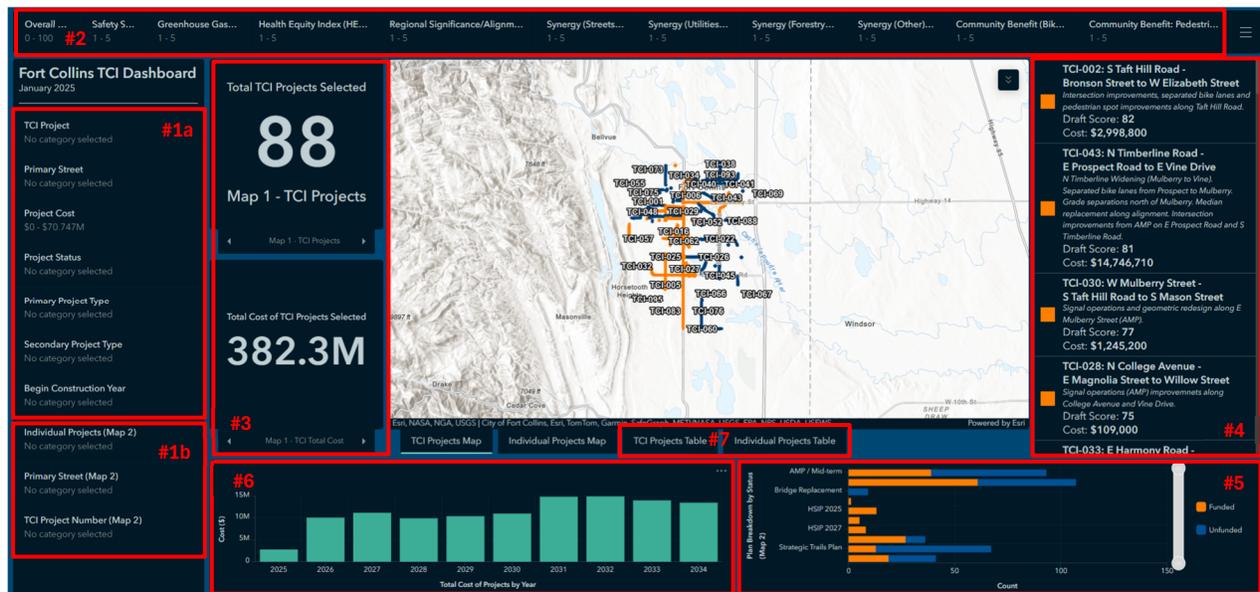
TABLE 9 – WEIGHTING SCHEME

Costing and scheduling are also calculated in the Project spreadsheet. Once all the scoring, costing, and scheduling are calculated, the spreadsheet can be joined to the TCI Project GIS layer. An unformatted copy of the TCI Project Scores tab from the master TCI Project List spreadsheet is used to populate the TCI Projects GIS layer. Once the TCI Project Scores is exported to a separate spreadsheet, displaying the spreadsheet values only (no formulas), then it can be added into ArcGIS Pro and spatially joined to the TCI Project layer using the TCI Project Number to join. Values from the spreadsheet are copied into the appropriate attribute fields using the Field Calculator.

Dashboard & Functionality

In ArcGIS Online, an interactive dashboard was created to display the TCI Projects and associated project scoring. ArcGIS dashboards provide information on a single screen with location-based analytics and interactive data visualizations. Dashboards integrate spatial data so users can visualize patterns, trends, and relationships. The TCI Project dashboard was set up so Fort Collins staff can view all the TCI Projects, and sort and filter Projects based on project information like location, status, cost, project type, and scoring. The dashboard consists of the TCI Project overview map, which displays all the TCI Projects that are listed in the spreadsheet. The TCI Project dashboard can be used to sort/filter TCI Projects and their associated information.

FIGURE 1 – DASHBOARD OVERVIEW



1. The left panel includes the selector list.
 - a. The top left portion of the panel includes predefined selectors allow users to sort, and filter based on various Project attributes for the TCI Projects Map, TCI Projects List, and main panels.
 - b. The bottom left panel includes filters for Individual Projects Map and Individual Projects List. This map is located behind the TCI Projects Map and can be accessed by clicking on the “Individual Projects Map” tab.
2. The top panel includes scoring filters. Users can adjust the scores to see how projects were scored.
3. Total TCI Projects Selected and Total Cost of TCI Projects Selected Indicators. Indicators tell users the total number of projects and project costs that are selected. Note that there are indicators for Map #2: Individual Projects Maps under the displayed indicators. Use the arrows below the indicators to toggle between the two different indicators.
4. TCI Project List. This list is dynamic and adjusts as project selections are made. This list is organized to display highest draft scores based on the current selection.
5. Plan Breakdown by Status (Map 2) graph. This graph shows the number of projects from each City Plan that are included within the TCI Project selection.
6. Total Cost of Projects by Year graph. This graph adjusts based on the projects selected.
7. Tables. The Tables tab includes the attribute table for the TCI Projects Map and Map #2: Individual Projects’ tables and displays projects based on the current selection of projects.

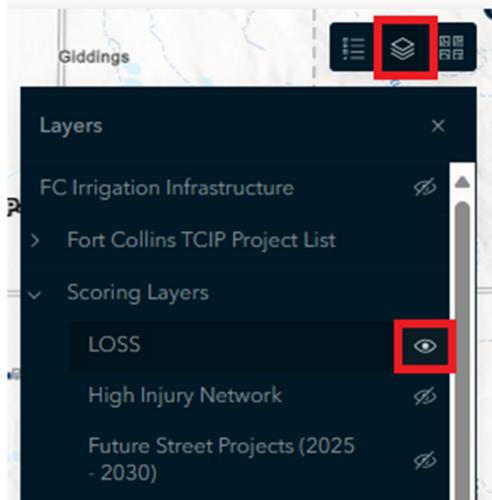
Dashboard Maps

There are two different maps within the TCI Project dashboard. These maps can be toggled between the two by clicking on the map tabs shown directly below each map. The main map in the TCI Project dashboard is the TCI Projects map which is linked to most of the other dashboard elements such as the selectors, indicators, and project list. Map 2, which is referred to as the Individual Projects Map displays all the individual projects from the City’s different plans. There are selectors built into the left panel to sort on the individual projects layer. Those selectors have “(Map 2)” associated with the selector name.

Background and Scoring Layers

Each map in the dashboard has additional GIS layers that can be toggled on and off. Those can be found under the Layers button on the top right of the map screen. To turn on and off the background/scoring layers, click on the eyeball icon next to each layer.

FIGURE 2 – SCORING LAYERS



Project Editing

The TCI Projects layer has been enabled for staff editing. The only field that is enabled for editing is the Project “Status” field. *(Note: all the other fields are Read Only to prevent from accidental editing.)* To edit this field, click on the TCI Projects Table, and click on the pencil button on the left side of each Project row.

Use Cases

Project Management - Editing Status

The TCI Projects layer has been enabled for staff editing. The only field that is enabled for editing is the Project “Status” field. *(Note: all the other fields are Read Only to prevent from accidental editing.)* To edit this field, click on the TCI Projects Table, and click on the pencil button on the left side of each Project row.

FIGURE 3 – PROJECT EDITING – PROJECT LIST VIEW

| TCIP Project Number | Primary Street | Project Limits 1 | Project Limits 2 | Project Cost | Status | Overall Score | Safety Score | GHG Reducti... |
|---------------------|--------------------|----------------------|-------------------|--------------|----------|---------------|--------------|----------------|
| TCI-032 | W County Road 38 E | Red Fox Road | S Taft Hill Road | 1,600,000 | Unfunded | 48 | 1 | 4 |
| TCI-067 | S Ziegler Road | S Kechter Road | - | 1,500,000 | Unfunded | 48 | 1 | 1 |
| TCI-086 | Suniga Road | Lindenmeier Road | N Timberline Road | 27,439,000 | Unfunded | 48 | 1 | 4 |
| TCI-094 | N Turnberry Road | E Vine Drive | County Road 50 | 8,000,000 | Unfunded | 46 | 1 | 1 |
| TCI-074 | Cherry Street | Lindenmeier Road | Maple Street | 6,000,000 | Unfunded | 45 | 1 | 1 |
| TCI-095 | Taft Hill Road | LC Landfill | Fromme Prairie | 1,000,000 | Unfunded | 45 | 1 | 1 |
| TCI-036 | N Timberline Road | Sykes Drive | E Suniga Road | 70,747,000 | Unfunded | 45 | 2 | 3 |
| TCI-046 | E Harmony Road | at UPRR Railroad | - | 1,000,000 | Unfunded | 44 | 1 | 3 |
| TCI-066 | Various | - | - | 1,500,000 | Unfunded | 44 | 1 | 1 |
| TCI-066 | Power Trail | - | - | 1,000,000 | Unfunded | 44 | 1 | 1 |
| TCI-071 | Laporte Avenue | N Impala Drive | Briarwood Road | 500,000 | Unfunded | 44 | 3 | 3 |
| TCI-068 | Various | - | - | 1,000,000 | Unfunded | 42 | 1 | 1 |
| TCI-072 | W Mulberry Street | near Overland Trail | - | 1,000,000 | Unfunded | 42 | 1 | 3 |
| TCI-069 | Poudre River Trail | - | - | 2,500,000 | Unfunded | 40 | 1 | 1 |
| TCI-093 | Off Street | Unknown crossing... | - | 500,000 | Unfunded | 40 | 1 | 1 |
| TCI-076 | E Trilby Road | East of S Lemay A... | - | 2,000,000 | Unfunded | 38 | 1 | 1 |
| TCI-077 | E Horsetooth Road | Ziegler Road | - | 1,000,000 | Unfunded | 38 | 1 | 1 |
| TCI-092 | S Timberline Road | Carpenter Road | - | 3,000,000 | Unfunded | 35 | 2 | 1 |
| TCI-073 | N Taft Hill Road | N US Highway 287 | - | 1,000,000 | Unfunded | 34 | 1 | 1 |
| TCI-091 | Giddings Road | N Timberline Road | Mountain Vista | 8,000,000 | Unfunded | 28 | 1 | 1 |

↓ Last update: 32 minutes ago

TCI Projects Map | Individual Projects Map | TCI Projects Table | Individual Projects Table

Once you select a Project to edit, the Edit Attributes dialog box appears. Scroll down to the “Status” field and click on the dropdown arrow to select the updated status of the Project. Select one of the predefined attributes, then click Save to save the changes. Note that only the project status can be modified currently. If needed, additional fields can be editable such that costs, timing, or scores could be changed.

**** Important note: currently the sharing permissions are for internal Fort Collins Staff only. If this dashboard's permissions are shared to the public, please be sure to create a “read-only” copy of the TCI Projects feature layer and disable editing permissions from the public.**

FIGURE 3 – PROJECT EDITING – PROJECT DETAIL WINDOW

Update attributes

Project Cost
1600000

CIP Project
Illustrative Project

Primary Project Type
Sidepaths

Secondary Project Type

Status
No value
Funded
• Unfunded
Design
Under Construction
Complete

0

Cost_2027
0

Cost_2028
0

Cost_2029
-

Cancel Save

Select Projects for Grants

Another powerful use case for the dashboard is to filter and select projects to identify them as candidates for grant applications. This can be done using the scoring filters in the top ribbon as well as filters along the left side to further tailor the selection to meeting the grant. For example, Highway Safety Improvement Program (HSIP) applications focus on safety, bike and pedestrian improvements, and equity. Furthermore, there are minimum and maximum grant amounts based on the available funding. To select candidate TCI projects, filter the Safety, Community, and Equity criteria to higher values and filter by the allowable cost range to find candidate projects. Note that a user may need to increase or decrease criteria to create a useful list of candidate projects. Once selected the “TCI Projects Table” shows the list of candidate projects.

FIGURE 4 – GRANT IDENTIFICATION

