

**COLORADO DEPARTMENT OF TRANSPORTATION
PRELIMINARY SURVEY SCOPE**

PROJECT INFORMATION	Project Number		Project Location		Project Code
Highway Number	Maintenance Patrol #	From Mile Post	To Mile Post	City or County Designation	
Section (s)	Township (s)	Range (s)	Principal Meridian	Nearest City / Town	
Design Unit Assigned	Project Manager	Survey Unit Assigned	Field Surveyor in Charge	Office Surveyor in Charge	ROW agent Assigned

Schedule Information

Scheduled date

Actual date

Date survey is needed:

FIR date:

FOR date:

Right-of-way Plan Review (ROWPR):

Ad date:

Roadway Design Requirements

Completed by Roadway Manager

Proposed project type:

Length of survey

Width of survey

Number of lanes

Check all that apply:

- Control Survey TMOSS by: GPS UAS MOBILE LiDAR TERRESTRIAL LiDAR
- Right-of-way preliminary field ties and investigation
- Survey for overlay quantities- Surface utilities: Valve boxes, Manholes, Traffic Control
- Other:

Include a sketch map / Previous plans of area and any special instructions as final page(s) of this request

Deliverable Requirements For Design

Completed by Roadway Manager and Surveyor in Charge

Electronic products required:

- MicroStation drawings as required by the CDOT file structure and workflows showing the proper topography line styles & symbols and separate drawings for the symbols, notes, elevations, codes, & names.
- A DTM model from MicroStation. containing all three-dimensional spatial data in its edited form.
- One MicroStation drawing called ____SURVEYSurface01.dtm containing all three-dimensional spatial data in its edited form. All TMOSS shot notes shall be shown on this drawing. Triangle sides in the TIN should not exceed: _____. All boundary strings should be defined.
- PDF OF THE Project Control and/or the Land Survey Control Diagram** and Microstation.DGN used to create the control diagram for the project Right of Way Plans.
- MicroStation drawing called ____SURV_LSCD.dgn of the Land Survey Control Diagram, (or PCD for Project Control Diagram) Diagram **delivered at the FIR.**
- A MicroStation drawing which includes **contours** on intervals of (Major:Minor)
- Copies of Permission to Enter Forms
- ELECTRONIC FIELD BOOKS IN LEGIBLE, STAMPED/SIGNED PDF BY THE PLS IN RESPONSIBLE CHARGE**
- UAS or LiDAR collected dgn;** add UAS or LiDAR dgn to file name to distinguish collection method from conventional or GPS
- .las or E57 format for UAS files and Lidar collected information 3D Models field books
- All electronic DTM models in final edited format compatible with MicroStation .
- One separate dgn of control, with accompanying .csv, .xlsx, and ctl files
- formats for photogrammetry, LiDAR or UAS

NOTES:

Environmental Requirements	Completed by Roadway Manager and Environmental Manager
<input type="checkbox"/> Not	
Wetlands	
Applicable	
Check all that apply:	
<input type="checkbox"/> Coordinate schedule with a wetland biologist to Survey wetland limits that have been established by the wetland biologists <input type="checkbox"/> Do not survey in wetland limits. Provide the final MicroStation drawing file to the environmental manager and wetland biologist. The wetland limits will be added to the MicroStation drawing by environmental personnel. <input type="checkbox"/> Perform TMOSS survey for wetland design/enhancement. Describe area to be surveyed. (Attach a location map) <input type="checkbox"/> Locate monitoring wells <input type="checkbox"/> StormWater -Wastewater-Water Quality facilities: see Utilities section	
NOTE: Inform the environmental manger and wetland biologist that the survey is complete by means of a courtesy copy of the survey transmittal letter whenever the survey request includes any wetland option checked above.	
<input type="checkbox"/> Not Applicable	
Hazardous Materials	
Are there any known hazardous materials located in the proposed work zone? <input type="checkbox"/> Yes <input type="checkbox"/> No	
CAUTION: Surveying around hazardous materials requires special training and equipment. Contact the Environmental Manager if hazardous materials are suspected on a project.	
Noise Study	
<input type="checkbox"/> Not Applicable	
<input type="checkbox"/> Locate buildings within 100, 200, 300, 400, _____ feet of the proposed centerline (Coordinate the specifics needed with the Region Environmental Unit)	

Structure Requirements		<input type="checkbox"/> Not Applicable
Number of Structures crossed (attached as constructed plans)	Number of major structures	Length from structure to be surveyed

Major Structure Structure ID No: _____ Mile Point: _____ Major Structure Structure ID No: _____ Mile Point: _____ Major Structure Structure ID No: _____ Mile Point: _____ Check all that apply: <input type="checkbox"/> Existing structure <input type="checkbox"/> Clearance heights required <input type="checkbox"/> TMOSS all features within typical limits described in the Survey Manual <input type="checkbox"/> Bridge expansion device elevations	<input type="checkbox"/> Survey attached utilities <input type="checkbox"/> Visible high-water mark <input type="checkbox"/> Present water level (record Date and Time of Survey) <input type="checkbox"/> TMOSS special limits (describe): <input type="checkbox"/> List additional structure features needed: <input type="checkbox"/> Other special instructions: <input type="checkbox"/> Deck cross-section normal to a control line
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Number of minor structures: _____ Check all that apply: <input type="checkbox"/> Include Drainage Code 283 in TMOSS notes <input type="checkbox"/> Include width of head walls in TMOSS notes <input type="checkbox"/> Digital Photographs of Inlet and Outlets <input type="checkbox"/> Other special instructions:	<input type="checkbox"/> Include type and height of inlets in TMOSS notes <input type="checkbox"/> TMOSS limits described in Survey Manual. <input type="checkbox"/> TMOSS special limits (describe)
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Traffic Requirements	<input type="checkbox"/> Not Applicable
Check all that apply: <input type="checkbox"/> Signing changes are required on this project <input type="checkbox"/> Include all traffic control devices in TMOSS <input type="checkbox"/> Include the following in a note: <input type="checkbox"/> What is on the sign <input type="checkbox"/> Panel size <input type="checkbox"/> Date on sign <input type="checkbox"/> Post material <input type="checkbox"/> Include the following details at signalized intersections: <input type="checkbox"/> Controller location <input type="checkbox"/> Detector loop locations <input type="checkbox"/> Include end anchor type on all guardrail installations <input type="checkbox"/> Traffic Control will be needed for Roadway TMOSS	
<input type="checkbox"/> Signalization changes are required on this project <input type="checkbox"/> Panel reflective quality--high or low <input type="checkbox"/> Post size & type of breakaway <input type="checkbox"/> Camera Locations	
• Traffic Control Company to be used:	

Access Number of accesses _____ <input type="checkbox"/> Access Code 277 in TMOSS Special instructions: Any anticipated closure or moving of access points requires CDOT form 138	<input type="checkbox"/> Not Applicable
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NOTES:

Utility Requirements: Subsurface Utility Engineering *LEVEL C ONLY* Not Applicable

Include owner name, contact person, address, and telephone number. Always show whether or not utilities are on CDOT right of way. Check all that apply:

A. Gas

Owner: _____

1. Buried, overhead or crossing
2. Size and pressure
3. Location (horizontal and vertical)
4. Locate vents, valves, markers, etc.

B. Transmission lines

Owner: _____

1. Buried, overhead, crossing
2. Elevation of lines
 - a. Depth
 - b. Height at poles
 - c. Height at low point of sag
3. Type of structures
 - a. Lattice
 - b. Single pole
 - c. "H" frame
4. Construction
 - a. Steel
 - b. Wood
 - c. Other
5. Single points (poles, etc.)
6. Guy-anchor poles

C. Electric lines (local)

Owner: _____

1. Buried, loose cables or in ducts; overhead, crossing
2. Elevation at poles, at sag points, depths
3. Type and construction of poles
- 4.

D. Communications

Owner(s): _____

1. Buried, loose cables or in ducts; overhead, crossing
2. Fiber optics or conventional wire cables
3. Location of pedestals, vaults, regeneration stations
4. Local services (drops, etc.) above, on, below surface

E. Water (domestic) includes wells

Owner: _____

1. Buried or supported
2. Size and type of pipes
3. Angle and junction points
4. Locations of valves, meters, vents, drains, etc.

F. Sanitary sewers

Owner: _____

1. Size and type of pipe
2. Manholes
 - i. Inlet and outlet elevations
 - ii. Top of manhole elevations

G. Television

Owner: _____

1. Buried, overhead
2. Owned poles, attached to others
3. Cables loose, in ducts
4. Depth
5. Locate pedestals, etc.

H. Pipelines ABOVE GROUND ONLY

Owner: _____

1. Buried or aerial
2. Size and type of pipe
3. Pressure
4. Storm Water – Wastewater-Water Quality ponds

I. Irrigation company

Owner: _____

1. Basic size of ditch
2. Flow-from ditch company
3. High water mark
4. Direction of flow
5. Period of use
6. Ditch Breaklines
7. Locate all division boxes
8. Get elevations of all boxes, drops, etc.

J. Miscellaneous

Owner: _____

1. Get all details (explain):

K. CDOT

Owner: _____

1. Get all details (explain):

L. Electronic Fieldbook

1. Separate Field Book for existing surface utility locations

Railroad Requirements		Not Applicable <input type="checkbox"/>
Railroad name / Operator	Person to contact at railroad	
Address of railroad right-of-way office	Phone number and, if known, e-mail address of contact	
Check all that apply: RAILROAD CROSSING ID NO: _____ APPROXIMATE HIGHWAY STREET LOCATION _____		
<input type="checkbox"/> Area affected by the proposed design railroad milepost _____ to railroad milepost _____ <input type="checkbox"/> Show if railroad right of way is fenced <input type="checkbox"/> Locate and tie railroad milepost (required for any railroad acquisition) <input type="checkbox"/> Show all lines and note sidings <input type="checkbox"/> Note type and condition of rail bed surface and material at all crossings <input type="checkbox"/> Survey profile grade on top of both rails at road crossings <input type="checkbox"/> Survey as-situated Centerline Alignment <input type="checkbox"/> Survey terrain data within railroad right of way <input type="checkbox"/> Locate all railroad topography in TMOSS including switches, sensors, signs, signals, X-bucks, etc.		
NOTE: Permission to Enter from the Railroad company is required prior to starting Survey		

Overlay Surveys	<input type="checkbox"/> Not Applicable
<input type="checkbox"/> Establish milepost references <input type="checkbox"/> Survey for overlay quantities- Surface utilities: Valve boxes, Manholes, Traffic Control <input type="checkbox"/> Gather topographic data by station and offset <input type="checkbox"/> Gather topographic data by milepost and offset <input type="checkbox"/> Included guardrail height samples <input type="checkbox"/> Include overhead clearances on utilities and structures <input type="checkbox"/> Include sign locations and heights to bottom of sign from ground <input type="checkbox"/> Tabulate existing delineators <input type="checkbox"/> Tabulate hazards within clear zone limit of _____ <input type="checkbox"/> Reference striping and no passing zones <input type="checkbox"/> Tabulate existing striping for inclusion in the plans <input type="checkbox"/> Establish centerline and take cross-sections. Cross-section interval: _____ <input type="checkbox"/> Locate and reference Government and aliquot corners that may be affected in the area the proposed design <input type="checkbox"/> Tabulate aliquot corners and accessories for inclusion in the plans within _____ distance from the edge of roadway. <input type="checkbox"/> Tabulate all government survey monuments; i.e., bench marks horizontal control within Project limits	

Survey Requirements	Completed by Professional Land Surveyor
MONUMENTATION <input type="checkbox"/> Not Applicable	
What monument type(s) and quantities will be set or reset? <input type="radio"/> ROW Monuments _____ <input type="radio"/> Control Monuments _____ <input type="radio"/> Aliquot Monuments _____ <input type="radio"/> 3-D Deep Rod Monuments _____	Have monument materials been provided by CDOT? (See CDOT Survey Manual for most current Specifications) Yes <input type="checkbox"/> No <input type="checkbox"/> Control Monuments shall be set such that they are intervisible with at least two other adjacent control monuments and shall have minimum conflict with construction activities.

Horizontal Control Not Applicable

Horizontal control by: CDOT Consultant Existing (explain: _____)

Horizontal control method:

- Traverse with total station
- Triangulation with total station
- GPS fast-static where densification has been completed (NGS)
- GPS densification and bluebook
- Project control tied to National Geodetic Survey

High Accuracy

- Georeferenced to Colorado State Plane Zone Operating or
- Reference Network (HARN) Continuing Reference System (CORS)
- National Spatial Reference System (NSRS)

Establish control monuments **NOT** to exceed 1000 feet or _____ spacing. As per Survey Coordinator

Specify monuments to begin and end horizontal control survey on:

Horizontal control tolerances required: CDOT Class A - Primary

Documentation required in submittal (check only those needed):

- FINAL STAMPED ELECTRONIC FIELDBOOKS Traverse file from data collector as an Electronic File
- Project Control Diagram file as an Electronic File
- GPS files as an Electronic File Control File .CTL as an Electronic File
- Copies of any new monument records from this survey

An electronic field book must include a description of the monument's size, shape, material, color, and markings which can be imported into Microstation and included in the Project Control diagrams.

A note is required on all survey markers found and tied in TMOSS

An electronic field book with a sketch showing what was found shall be included and related to the point # in the electronic file.

Vertical Control Not Applicable

Vertical control method:

- Differential level closed loop through control monuments
- Trigonometric level closed loop through control monuments
- GPS differences from known bench marks

Known bench marks in the vicinity with NAVD '88 elev's:

Mark Number: _____ Elevation: _____ m. Elevation: _____ feet (Note US survey or International)

Mark Number: _____ Elevation: _____ m. Elevation: _____ feet (Note US survey or International)

Mark Number: _____ Elevation: _____ m. Elevation: _____ feet (Note US survey or International).

- Establish a bench mark on each control monument Establish additional bench marks every _____ feet.
- A complete "Report on the Condition of Survey Mark" is required on all found federal bench marks Establish vertical control for an aerial survey.
- Establish profile grade on "as constructed" centerline

No elevations needed

Documentation required:

- PLS Stamped copies of field books Copy of reduced Electronic level notes, PLS stamped
- Final elevations included in CTL file

Topography Not Applicable

Topographic survey method:

- TMOSS Other – explain : _____

Locate features:

- All within survey area Utility surface appurtenances only
- Streets, roads, and approaches only Drainage and irrigation structures only
- Structures only Landscaping features only
- Others:

Tolerances on TMOSS topographic survey are listed in the most current CDOT Survey Manual.

Other topographic methods do not include elevations.

NOTE Collection method:

Lidar mobile lidar UAS GPS (distance between shots not to exceed _____ feet.

Documentation required: Digital pdf of Paper

Submit electronic products on: E-mail attachments Other: _____

NOTES:

Discuss TMOSS coding of UAS and LiDAR deliverables

Right-of-Way Requirements

Not Applicable

Is right-of-way involvement anticipated on this project? Yes No
Are Forest Service and/or Bureau of Land Management clearances needed on this project? Yes No
Approximate number of property owners _____. (Attach assessors' maps, deeds, subdivision plats, right-of-way plans, preliminary plots, permission to enter forms.)

Professional Land Surveyor responsible for plans will research deeds and plats.

Check all that apply:

Tie all the Public Land Survey System needed for CDOT R.O.W. acquisition purposes in Section(s)

_____,
Township(s) _____, Range(s) _____, Principal Meridian _____.

- Establish straddle ties as described in the most current CDOT Survey Manual on all section corners
- Establish references and complete a monument record form for all corners that are required by statute.
- Search for all owners' property pins adjacent to survey to aid in the establishment of property boundaries.
- Search for and tie all right-of-way markers found
- Include possession evidence and all improvements within _____ feet (minimum = 5' per CRS) of the right-of-way line in the TMOSS survey

- Include evidence of burial grounds and cemeteries in TMOSS
- Include evidence of easements like paths, utility markers, and risers, poles and valves, in the TMOSS survey
- Note street names and alleys in TMOSS survey
- Note street address numbers in TMOSS survey
- Establish "as constructed" centerline from right-of-way markers (Attach right-of-way plans)
- Make appropriate land ties to describe and purchase a wetland or construction parcel or easement

An electronic field book must include a description of the monument's size, shape, material, color, and markings which can be imported into Microstation and included in the Project Control diagrams.

An electronic field book with a sketch showing what was found shall be included and related to the point # in the electronic file..

NOTES:

DISCUSS CHAPTER 2 of the ROW MANUAL and Survey manual location at <https://www.codot.gov/business/manuals>

Survey Manual currently being updated; Chapter 2 of the ROW Manual to be posted early 2021