Oregon Department of Transportation **Highway Directive**	NUMBER TRA 07-15	SUPERSEDES NEW
	EFFECTIVE DATE 07/21/17	PAGE NUMBER 01 OF 05
	VALIDATION DATE	
	AUTHORING BRANCH Technical Services Branch, Bridge and Geometronics units	
SUBJECT **Vertical Clearance**	APPROVED SIGNATURE Original signed by Paul Mather	

PURPOSE:

The purpose of this directive is to establish consistent Highway Division procedures and guidelines to ensure an effective and coordinated approach to collect, update, and share accurate and reliable Vertical Clearance (VC) data with both internal and external stakeholders.

GUIDELINES:

This directive will require Highway Division Branches to review and update existing manuals, processes and standard operating procedures or create new (if necessary) to establish consistency and continuity of collecting and updating VC of bridges and traffic structures within ODOT's Right of Way (ROW). In addition, paving operations or other projects that may potentially alter VC must be planned and constructed to maintain or improve current VC and reasonable measures must be put in place to prevent reducing VC.

DEFINITIONS:

Bridge Structures – Highway bridges and overcrossings, railroad undercrossings, and tunnels.

Traffic Structures – Structures that support a signal, sign or luminaire.

Vertical Clearance – The perpendicular distance from the roadway surface to a point on the underside of the structure.

Vertical Clearance Discrepancy – The difference between new and old vertical clearance measurements of bridges and traffic structures as a result of new construction, maintenance work, and other factors.

Controlling Structure – The lowest structure over a highway or section of highway that limits routing of over height loads.

BACKGROUND/REFERENCE:

The Motor Carrier Transportation Division (MCTD) reviews applications and issues permits for the safe movement of over-dimension loads and vehicles in the State of Oregon. The need for accurate VC data for bridge and traffic structures is critical for MCTD to provide safe routes for over-dimension loads and vehicles.

The Vertical Clearance Measurement System (VCMS) utilized by Bridge Section for measuring VC has reached the end of its useful life cycle. The VCMS needs to be replaced with a system that meets current and future needs. A multi-disciplinary team was established to explore alternatives that would meet the requirements previously agreed upon between Bridge Section and MCTD.

The team recommended that LiDAR mobile mapping technology be utilized to replace VCMS as the primary measuring tool for VC. An agreement was formed between Bridge Section and Geometronics Unit for the collection of future VC data.

EXPLANATION

This section provides procedural guidelines for planning, design, project & maintenance staff for data collection and update.

Paving and/or surfacing (construction or maintenance) work under structures within ODOT ROW shall follow program specific procedures for measuring and reporting vertical clearance measurements.

Important information to know about VC requirements:

- Bridge Section is responsible for VC Program and reports VC data to MCTD, which issues oversized load permits.
- Construction and maintenance work shall not reduce existing vertical clearance per the ODOT Highway Design Manual, ORS 366.215 (Reduction in Capacity), and Division 12, OAR 731-012-0030, when:
    - The VC is below minimum vertical clearance standards.
    - The existing VC is substandard.
    - The structure is on a Reduction Review Route (Safety and Access exceptions allowed).
    - The structure is a “controlling structure”; or a reduction would create a new lower controlling structure on a given highway or important highway segments used to route oversize loads.
- Pre and Post construction VC shall be verified to comply with current policies, rules, and regulations.
- VC measurements shall be collected by or under the direction of ODOT Geometronics Unit.

Pre-Construction Planning & Design Work

- Check with Region Mobility Liaisons and Bridge Section-VCMS/Load Rater for current vertical clearance data within the project area.
- If existing data is not collected with LiDAR, request Geometronics Unit to collect new data.
- Compare new vertical clearance data with existing MCTD-Electronic Routing System data and resolve the VC discrepancy with Bridge Section, if any.
- Acceptance or moderation of any net reduction in clearance on a given highway or important highway segment will only result after a thorough investigation, analysis and agreement by both VCMS/Load Rater and MCTD.

- Identify design elements in the project plans that will permanently change vertical clearances.

During Construction

- Project Manager provides Geometronics Unit with Contractor's estimated completion dates for construction on bridge structures, overhead sign structures, signals, and/or other changes to permanent vertical clearances, and to establish VC verification schedule.
- ODOT measures VC, according to Geometronics procedures for measurement, following installation to confirm minimum vertical clearances requirements have been met per Contract Plans. If adjustments by the Contractor are required, Project Manager notifies the ODOT Geometronics Unit for follow-up VC measurement verification.

ROLES & RESPONSIBILITIES

Geometronics Unit Role:

The Geometronics Unit will assume the following responsibilities starting July 1, 2017 to collect VC of bridges, traffic structures, and tunnels.

- Data collection:
  - VC data collection on an agreed upon schedule by Bridge and Geometronics Unit.
  - Pre and post construction VC will be collected as required.
  - Expedited VC collection will be available to address project delivery and immediate MCTD needs for routing purposes.
  - For projects in construction, the ODOT Project Manager may contact Geometronics to request VC measurements in a timeframe that would allow for contractor corrections where needed. Geometronics will perform measurements or coordinate with Region Survey Units to complete measurements.
- Data Processing:
  - Annual data collected will be processed in a timely manner, not exceeding 180 days.
  - Geometronics will process measurements and send stamped project measurements to Bridge Section and other customers in a timely manner.
- Data Handoff:
  - Provide surveyor stamped measured data, including: date, measurement method, and accuracy information.
  - Provide VC measurement data to Bridge Section-VCMS/Load Rater staff in an agreed upon format.
    - Compare new vertical clearance data with existing MCTD - Electronic Routing System data and identify discrepancies.
    - Works with Bridge Section to resolve discrepancies.

Bridge Program Unit (BPU) Role:

- VCMS/Load Rater is the primary interface between the Bridge Program Unit (BPU) and the Geometronics Unit regarding VC data review and the resolution of discrepancies.
- BPU Manager reviews verified data and supplies to MCTD.
    - Works with Geometronics as needed to resolve discrepancies.
    - Works with MCTD as needed when variances in data result in a loss of VC to a controlling structure or creates a new controlling structure.
- BPU staff provides VC support to internal and external partners.
- BPU represents agency and collaborates with MCTD in VC matters.

Action required:

- **Region Technical Centers** – Provide guidance and training to staff to address VC during planning and to communicate with Region Mobility Liaisons and Bridge Section-VCMS/Load Rater as needed. During the Preliminary Engineering phase coordinate pre-construction VC data collection for bridge structures, signals and sign structures, within the project area, if needed. Identify staff/position performing responsibilities identified in Pre-Construction Planning& Design Work
- **Region Survey Unit's** –Geometronics will coordinate with the Region Survey Unit's regarding equipment and operator availability to assist in VC data collection when needed.
- **Construction Office** – Update the Construction Manual and provide guidance during the Construction Engineering phase and coordinate post-construction VC data collection within the project area with Geometronics Unit.
- **Maintenance and Operations Branch** - Update any maintenance operational notices to provide guidance to maintenance staff when performing activities potentially impacting VC to stay in alignment with this directive. IF VC is potentially affected, coordinate measurement of VC with Geometronics Unit.
- **Pavement Unit –** Update Pavement Design Guide to address VC measurement pre & post construction.
- **Region Mobility Liaisons** – Consult with BPU and MCTD on VC issues.
- **MCTD** – Provides information to the BPU regarding impacts to oversize load routing that is a result of a VC variance. Collaborates with BPU to resolve VC variances if warranted. Provide Read Access to the Electronic Routing Manual (ERM) to Geometronics Unit.

RESPONSIBILITY	ACTION
Chief Engineer	Establish procedures and provide guidance needed to implement this directive. Monitor implementation of directive and procedures, make improvements, and take action to correct non-compliance. Revise directive and procedures as needed to remain compliant with Federal regulation and Oregon statutes, as well as maintaining synchronicity with current technology.
Construction and Maintenance & Operations Engineers	Revise any manuals and procedures as needed for construction and maintenance guidance to remain in alignment with this directive.
Discipline Leadership Teams	Ensure standards and practices coincide with this directive in the implementation of LiDAR technology for VC measurement. Prepare/modify discipline specific guidance and coordinate with leadership teams responsible for disciplines with similar skills. Review discipline specific guidance annually to ensure that it is up to date.
Division, Region, District, Section, Unit Managers	Ensure this directive is distributed to and discussed with employees. Distribute and communicate related procedures, guidelines, and revisions to this directive to employees, consultants, local agencies, and contractors. Establish quality control/assurance procedures to ensure implementation of this directive and other discipline specific guidance. Recommend changes to Chief Engineer.
Engineering Automation – Geometronics Unit	Provide guidance on the procedures to collect and use VC measurements. Coordinate with the regions and other business partners regarding use and management of the LiDAR technology.
Employees	Complete training and comply with this directive and related procedures and guidelines. Bring questions and issues to manager or supervisor for resolution.