

**The Project Concept for: INDOT's Proposed Automated Vertical Clearance Measuring Project.**

**Proposed Services: Automated Clearances Measuring over and under INDOT Bridges.**

INDOT is required by Federal Regulations, and the FHWA to measure and report the "minimum" Vertical and Horizontal Clearances under each bridge in the INDOT Bridge Inventory, for inclusion into the National Bridge Inventory. The FHWA conducts an annual review to ensure compliance to these Regulations.

In addition to what is required by the Federal Regulations, INDOT requires more vertical and horizontal clearance data be gathered to better manage our inventory of bridges, and to provide support for the permitting of Oversized Vehicles to use our roads, as well as the growing number of phased construction projects which temporarily shift traffic lanes under a bridge, (onto shoulder areas).

It is becoming increasingly difficult for INDOT Bridge Inspectors to accurately and completely measure these clearances in a timely manner due to safety concerns, and the time it takes to physically get these measurements in all of the needed locations.

The FHWA requires that each bridge have a "Routine" Inspection performed once every 2-years (Biennial Inspection). As part of this Inspection, Bridge Inspectors "Verify" existing clearance measurements, and check for any changes, {This may only involve checking a few measurements, if no discrepancies are found, with old fashioned Clearance Rods}.

INDOT requires that the vertical clearance be taken after a bridge is built, rehabbed, repaired, or if the roadway underneath had been worked on in any way. In addition, INDOT would like to have all the measurements on a bridge taken periodically (+- 10-year frequency), to ensure that something has not been missed. Finally, measurements are required to be taken as soon as possible after a collision, so that clearance signage can be adjusted, if needed.

INDOT has very specific requirements as to what needs to be measured.

**As a Minimum:**

1. **Vertical Clearances** must be taken at both coping beams, over each striped lane line, and at the edge of both the paved shoulders and any unpaved shoulder area that could be driven on in an emergency, no matter how far away from the normal roadway.
2. **Horizontal Clearances** must be taken under the bridge at the minimum lateral distance between fixed physical obstructions.
3. **Right and Left Lateral Clearances** are required to be taken as specified by the FHWA, from the "Thru-Lane" pavement lines to physical obstructions, both to the right and to the left (if applicable).

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**A starting point for a Scope of Work to gather the needed Clearance data for INDOT would be:**

1. Measure the Vertical Clearances under each INDOT bridge that crosses over a public roadway, starting with the Interstate Highways, then proceeding to the US Routes, State Routes, and then Local Streets/Roads under INDOT Routes
2. Measure the Vertical Clearance over each lane line (whether striped or not). As a minimum, the Clearance shall be taken at both coping beams.
3. Measurements of the Vertical Clearances shall be accurate to the nearest tenth of an inch, (pavement to superstructure element).
4. Clearances to sign structures or other attachments, physically attached to the bridge are to also be taken, but reported separately.
5. The Clearance locations shall be documented using accurate GPS coordinates.
6. The Vertical Clearances and their locations shall be accurately plotted graphically on both a "General Plan" and "Elevation Plan" type drawing.
7. The Clearance Data shall be stored in a format that can be easily used and stored by INDOT in its NBI Bridge Database.
8. Clearances shall be taken at or near highway speeds, in a safe manner to both the public and the people gathering the data.
9. Using GPS coordinates; the Horizontal Widths of each Lane shall be calculated and shown on the Drawings.
10. Lateral Clearances shall be taken from the right and left most lane lines of the "Thru-lanes" to any permanent objects on the shoulders, to determine the minimum Lateral Clearances, and shown on the Drawings. This shall be done in a way that is safe to both the public and the people gathering the data.
11. A "Defense Vertical Clearance" (see NBI Data Item #10) shall be calculated and located for each span under a bridge that has a public roadway under it.

Not all of the above items will be required under this initial contract, (Items #'s 5, 6, 9, 10 and 11 may not be included.). INDOT is initially interested in getting the required data for each bridge in an electronic format so that the minimum clearances can be extracted, and placed in INDOT's NBI Data Base.

In the future, more elaborate graphical plotting of the data may be pursued, but that is not a requirement for this first contract.

It is expected that the Consultant that will be awarded this contract will use a measuring device attached to a vehicle that will travel at normal highway speeds, and will not be a hindrance or hazard to the motoring public. The Consultant may be required to have a trailing vehicle with proper flashing lights in order to provide warning to motorist.

A determination of a time frame for re-measurements will have to wait until a better idea of the cost involved in this work is developed. However, it is expected that several contracts will be required to get the initial measurements for all INDOT Bridges.