

B-36229 Change Order #6 Narrative

This change order represents the methods to treat existing unsuitable soil conditions beneath both existing and proposed roadways and temporary shoofly. Unsuitable soil conditions have been encountered under the existing roadways of 45th St and Calumet Ave, under the temporary shoofly, and under the proposed alignment of 45th St at the underpass. The Engineer of Record (EOR) was consulted as soon as unsuitable soils were encountered. Site samples of the existing soil were obtained by DLZ and evaluated by INDOT. Results indicate an organic content of 2.5 percent and a liquid limit of 27. The contract geotechnical investigation indicates highly organic soils, greater than 50 percent, and soft or unsuitable soils with a liquid limit greater than 50 should be removed from the subgrade area within the construction limits prior to construction of the roadway. Proof rolling and direct cone penetrometer (DCP) tests have shown unsuitable soils exist with half the organic content and liquid limit parameters stated within the geotechnical report. Furthermore, the designers' geotechnical engineer of record was requested back onsite to evaluate existing soil conditions within the new alignment of 45th St between Centennial Dr and the proposed underpass. See markup of plan sheets 95 and 96 showing locations and results of site testing investigation. The recommendation for the new alignment of 45th St, between STA 27+50 and 31+00, based on soil borings, existing conditions and onsite investigation is to remove at least 30 inches of unsuitable soils, and replace with layer of geofabric for separation and filtration, a layer of geogrid and 30 inches of IN-2 (2 inch coarse open graded aggregate) or similar material. Additionally, the geotechnical recommendation also states that precautions shall be taken to avoid water infiltration into the bottom of the undercut and treatment elements. In all other locations where unsuitable soils are encountered, 24 inches of the material shall be removed and replaced with coarse open graded aggregates for stabilization. Coarse open graded aggregates shall consist of either an IN-5 (1 inch coarse open graded) or IN-2 approved aggregate. Proof rolling shall be performed to identify and confirm unsuitable soil conditions, locations and limits and will be verified with soil testing. Alternate aggregate materials, such as sand and IN-53 (1 inch top size coarse and fine graded) aggregates, were initially used to bridge the unsuitable soil conditions at incremental depths to no avail. Coarse open graded aggregates (IN-5 and IN-2) provided the most stability. Coarse open graded aggregates will also prevent moisture from wicking to the surface having detrimental effects on the roadway and temporary railway above. Existing contract items for common excavation and unclassified excavation will be utilized to quantify the removal of unsuitable soils. Common excavation quantities will be measured within the existing roadway limits. Unclassified excavation quantities will be measured outside the existing roadway limits.

SHOOFLY. For construction of the temporary shoofly to support the CN rails and train traffic, it was agreed to remove 24 inches of unsuitable soils and replace with compacted coarse open graded aggregates for stabilization. The limits include the ditch north of CN and south of 45th St east and within the exiting roadway of 45th St east.

45th St EXISTING AND PROPOSED ROADWAY LIMITS. For construction of 45th St, east and west of Calumet Ave, within the existing roadway limits, the 24 inch removal process will be utilized in conjunction with backfill of compacted coarse open graded aggregates for stabilization. For new construction of 45th St between Centennial Village and 45th St east, per the designers' geotechnical engineer of record, 30 inches of unsuitable soils shall be removed and replaced with a layer of geotextile fabric, a layer of geogrid, and compacted coarse open graded aggregates. Due to the recommended removal depth of 30 inches, the proposed underdrain runs between relief wells shall be installed in conjunction with the undercut operations. The relief wells shall be over excavated to install the check valves and tees. The planned underdrain shall be placed at the bottom of the undercut following placement of the geofabric and geogrid. The geofabric layer shall also be placed up the vertical faces of the undercut and wrapped outside the proposed roadway to prevent sedimentation. An estimated quantity of aggregates for underdrain will be removed from the contract quantity where undercut backfill shall be installed between STA 28+50 and 31+50.

CALUMET AVE EXISTING AND PROPOSED ROADWAY LIMITS. For construction of Calumet Ave within and outside the existing roadway limits, the 24 inch removal process will be utilized in conjunction with backfill of compacted coarse open graded aggregates for stabilization.

Under this change order two new items are being created, B Borrow for Undercut Backfill and Geogrid Type 1B. These items will be participating since the work is necessitated by the roadway project. An estimated quantity for B Borrow for Undercut Backfill of 15,800 Tons are being added under this change order item based on quantity placed to date and projected quantity. An estimated quantity for Geogrid Type 1B of 4,800 SYS are being added under this change order item based on projected quantity. Also included under this change order are underrun and overrun to existing items. The existing Common Excavation item is being increased an estimated 3,400 CYS for removal of unsuitable soils under the existing roadway based on quantities removed and projected quantity. The existing Unclassified Excavation item is being decreased an estimated 450 CYS for removal of unsuitable soils outside the existing roadway based on the difference between planned contract quantity and projected quantity. The existing Aggregate for Underdrain item is being decreased an estimated 200 CYS for locations being replaced with Undercut Backfill. Total change order cost is projected to be \$684,451.50 including new and existing items.

This change order has been designated as errors and omissions, constructability related, due to the geotechnical recommendation to remove unsuitable soils at limits below those identified in the contract geotechnical report. This is verified by the recommendation provided to remove 30 inches of unsuitable soils between STA 27+50 and 31+00. For roadway construction, only 12 inches of compacted aggregates is included in the contract pay items as Subgrade Treatment, Type IC.



Existing soil conditions rutting under construction traffic – proposed 45th St between underpass and Centennial Village.



30" undercut of existing soils replaced with geotextile fabric, geogrid and IN-2 between proposed underpass and Centennial Village.