City of Bel Aire, Kansas

STAFF REPORT

DATE: June 15, 2026
TO: Ted Henry, City Manager
FROM: Anne Stephens, PE, City Engineer
RE: Proposed Change Order 26 for Soft Soils

Current Situation:

Once the excavation of Woodlawn reached the bottom of the 2' rock layer, the floor of the excavation was proof-rolled. The proof-rolling found several areas of soft soil. PEC's recommendation is to remove and replace the soft soils with suitable soils. Understanding some of the challenges that the removal and replacement method will likely pose, PEC also presented an alternative method of chemically stabilizing the top 12" of soil at the current bottom of the excavation with lime to provide a solid base from which to build on. Additionally, PEC recommends that a geotextile be placed on top of the treated subgrade (whether treated with lime or new material) and below the rock layer for additional stability and to maintain separation between the treated subgrade and the rock. This change order reflects the material and labor costs necessary to perform both options for handling the soft soils found on Woodlawn.

Discussion:

Once the soft subgrade soils were noted and a path forward identified, a soil sample was delivered to the KDOT lab for them to start working on testing the soil and lime mixture to determine a percentage of lime incorporation necessary to modify the soil to the desired parameter. The goal of this testing is to get the Plasticity Index (PI) below 15. The Plasticity Index is a measure of how much a soil can be deformed before it breaks (think different moisture levels in a piece of play-doh). The PI is the difference between the Plastic Limit (where the soil can be molded without breaking – think play-doh right out of the container) and the Liquid Limit (where soil behaves more like a fluid) and it covers a range of water content over which the soil remains in a plastic (moldable) state.

The Plasticity Index for the 5% lime mixture was 27. The PI of the 6% lime mixture was 24. At this point, PEC requested that KDOT test an 8% lime mixture. This 8% lime mixture dropped the PI from 25 to 9, which is in the desirable range. Once the percentage of lime was settled, KDOT began running moisture density testing on the soil mixture to develop a Proctor, which is a curve showing the relationship between the moisture of the soil and the density. This curve will be used in the field as a comparison during testing operations to determine the percentage of compaction.

Following KDOT's testing, PEC provided a recommendation for the percentage and depth of lime treatment needed for the Woodlawn subgrade. This recommendation covers the entirety of the project north of the tracks. It should be noted that if the soil type differs from the soil tested for lime stabilization, adjustments to the percentage of lime incorporated will need to be made. Lime stabilization will not be needed south of the tracks, since that area will be a mill and overlay and no additional excavation, other than the underdrains will be required.

As mentioned above, PEC also recommends the placement of a geotextile between the lime treated subgrade and the rock for additional stability and to maintain the separation of the rock above and the lime treated subgrade below. The material and labor costs of supplying and installing this material is also included with this change order.

As a more conservative option, PEC recommends the removal of 2' of soil below the current bottom of the excavation. The replacing soil would need to be a low volume change (LVC) material as identified in the KDOT Excavation specification for suitable replacement material. While this method is more expensive and has its own challenges, it completely removes the unsuitable material from the area, therefore removing the risk associated with leaving the unsuitable soil in place. PEC also recommends the placement of a geotextile between the LVC material and the rock for added stability. The material and labor costs of supplying and installing this material is also included in this change order.

Pearson's cost for the removal and replacement of 2' of unsuitable material is $976,800.00. Pearson's cost for the installation of a geofabric above the replaced material is $63,080.00. The total cost of the removal and replacement of 2'of unsuitable material is $1,039,880.00. Pearson requests an additional 60 working days for the removal and replacement of 2' of unsuitable material and an additional 8 working days for the geofabric installation for a total of an additional 68 working days.

Pearson's cost for the lime stabilization of 12" of material is $648,944.00. Pearson's cost for the installation of the geofabric above the lime stabilized base is $63,080.00. The total cost of this alternative is $712,024.00. Pearson requests an additional 45 working days for the lime stabilization and an additional 8 working days for the geofabric installation for a total of 53 additional working days.

Financials:

A summary of costs for the Woodlawn project is provided below:

Original Contract (Bid) Price	$8,571,662.01
Change Order 1 (disincentive for temporary asphalt that did not meet specs)	($1.00)*
Change Order 2 (sanitary sewer line reconstruction)	$27,038.00
Change Order 3 (working day adjustment for CO 2)	No change in cost
Change Order 4 (exploratory excavation for waterlines under UPRR ($5,685.75) and water line lowering	$59,655.75
Change Order 5 (quantity adjustment for steel and temporary traffic marking tape)	$39,281.90
Change Order 6 (Shifting of Water Lines 2 & 3)	$6,405.00
Change Order 7 (Rock Ditch Check & Odessa Water Line/RCB conflict)	$8,872.50
Change Order 8 (Adding lights to stop sign at 45th Street)	$756.00
Change Order 9 (45th Street "DO NOT TURN LEFT" sign)	$367.50

Change Order 10 (Extra Work for Additional Cost for Elliptical Pipe)	$1,412.25
Change Order 11 (Additional working days from 37th Street water line conflict)	No Cost
Change Order 12 (Retaining Walls for Odessa)	$38,556.00
Change Order 13 (Additional Signage	$761.25
Change Order 14 SWPPP Spec Change	No Cost
Change Order 15 – 45th and St. James SWS	$15,215.75
Change Order 16 – SWS Line 4A Rework	$27,389.45
Change Order 17 – Pedestrian Push Button Poles	$22,127.70
Change Order 18 – Replacement of Traffic Lights	$4,036.20
Change Order 19 – Additional Water Line Casing	$5,080.00
Change Order 20 – Additional water Line Casing	$13,106.36
Proposed Change Order 21 – Final SWS Quantities from original work (Still in draft mode – waiting on KDOT approval)	($1,529.00)
Change Order 22 – Asphalt and Fuel Price Adjustment	$72,306.32
Change Order 23 – Remobilization for permanent striping south of Railroad tracks	$4,200.00
Change Order 24 – Reconstruction Bid	$4,796,884.57
Proposed Change Order 25 – Final Quantities Signing, Pavement Marking, Traffic Control from previous work	$14,346.86
Total Prior to Proposed Change Order 26	**$13,727,931.37**

* This quantity was previously shown as $2,340.00, but Pearson made a change to their mix design that negates this disincentive and there have been no additional issues since the change to the mix design.

Total Prior to Proposed Change Order 26	$13,727,931.37
Proposed Change Order 26 – Alternative 1 – Remove and Replace Material and install geotextile	$1,039,880.00
Total Contract Cost with Proposed Change Order 26 – Alternative 1 – Remove and Replace Material	**$14,767,811.37**

Total Prior to Proposed Change Order 26	$13,727,931.37
Proposed Change Order 26 – Alternative 2 – Lime Treated Subgrade	$712,024.00
Total Contract Cost with Proposed Change Order 26 – Alternative 2 – Use Lime Treated Subgrade	**$14,439,955.37**