T&E COMMITTEE #2
April 19, 2012

MEMORANDUM

April 17, 2012

TO: Transportation, Infrastructure, Energy and Environment Committee

FROM: Glenn Orlin, Deputy Council Staff Director GO

SUBJECT: Update—Silver Spring Transit Center project

The Paul Sarbanes Transit Center project replaces the existing 30-year-old transit facility with a new three-story, multi-modal transit center, a pedestrian friendly complex supporting rail (Metrorail and MARC), bus (Metrobus, Ride On, intercity bus and various shuttle bus operations), taxis, and kiss-and-ride drop-offs. The project provides for future Transit Oriented Development opportunities, the Gene Lynch Urban Park, the Metropolitan Branch Trail and the future alignment of the MTA Purple Line. The first phase—the relocation of the MARC station to be adjacent to the Metro station—was completed several years ago. The second (and much larger) phase proceeded to construction in the fall of 2008. Currently the project is about 90% finished and, until recently, its completion was anticipated later this fiscal year. The total cost of the project is $101,438,000; Federal aid provided about half the funding, State aid about 15%, and various County sources have covered the 35% balance. The project description form in the FY11-16 Capital Improvements Program is on ©1-2.

In January it was reported that a major problem with how the concrete was poured on the reinforcing bars (rebars) on the top floor of the transit center (©3-6). Department of General Services (DGS) Director David Dise noted that the concrete work was compliant neither with Washington Metropolitan Area Transit Authority (WMATA) nor general industry standards. He briefed the Committee on January 30.

Mr. Dise and staff will present an update on this matter. On March 15 Foulger-Pratt transmitted its studies and response to DGS (see excerpts on ©7-27). Foulger-Pratt has also been invited to attend this meeting.

Silver Spring Transit Center -- No. 509974

Category	Transportation	Date Last Modified	January 13, 2011
Subcategory	Mass Transit	Required Adequate Public Facility	No
Administering Agency	General Services	Relocation Impact	None.
Planning Area	Silver Spring	Status	Under Construction

EXPENDITURE SCHEDULE ($000)

Cost Element	Total	Thru FY10	Rem. FY10	Total 6 Years	FY11	FY12	FY13	FY14	FY15	FY16	Beyond 6 Years
Planning, Design, and Supervision	16,837	10,164	1,197	5,476	2,345	3,131	0	0	0	0	0
Land	309	161	0	148	148	0	0	0	0	0	0
Site Improvements and Utilities	11,531	129	9,552	1,850	1,850	0	0	0	0	0	0
Construction	62,884	22,533	1,364	38,987	32,217	6,770	0	0	0	0	0
Other	7,285	258	4,694	2,333	2,333	0	0	0	0	0	0
Total	**98,846**	**33,245**	**16,807**	**48,794**	**38,893**	**9,901**	**0**	**0**	**0**	**0**	**0**

FUNDING SCHEDULE ($000)

Federal Aid	49,496	24,131	9,903	15,462	15,462	0	0	0	0	0	0
G.O. Bonds	29,127	3,258	4,417	21,452	11,551	9,901	0	0	0	0	0
Impact Tax	1,802	0	1,802	0	0	0	0	0	0	0	0
Land Sale	4,339	3,747	592	0	0	0	0	0	0	0	0
Mass Transit Fund	93	0	93	0	0	0	0	0	0	0	0
State Aid	13,989	2,109	0	11,880	11,880	0	0	0	0	0	0
Total	**98,846**	**33,245**	**16,807**	**48,794**	**38,893**	**9,901**	**0**	**0**	**0**	**0**	**0**

DESCRIPTION

This project replaces the existing 30 year old Silver Spring transit facility with a new 3-story, multi-modal transit center that serves as a vital part of the Silver Spring revitalization initiative. Phase I of this project, completed by the State, relocated the MARC facility near the transit center. In phase II, the eight acre site will be jointly developed to accommodate a transit center, an urban park, and private development. The transit center consists of a pedestrian friendly complex supporting rail (Metrorail and MARC), bus traffic (Ride On and Metrobus, inter-city and various shuttles), and automobile traffic (taxis and kiss-and-ride). The current design allows coordinated and integrated transit-oriented private development adjacent to the transit center. Major features include increasing bus capacity by approximately 50 percent (from 23 bus bays to 32), a 3,500 square foot inter-city bus facility, extensive provisions for safe pedestrian and vehicle movement in a weather protected structure. The project also includes a realignment of Colesville Road, a new traffic light at the transit center entrance, connections to MARC platforms, and enhancement of hiker/biker trails. The design allows sufficient space for the future Purple Line transit system and for an interim hiker/biker trail that will be reconstructed as a permanent hiker/biker trail when the Purple Line transit facility is built in the reserved area. The transit center will be accessible from all sides and on all three levels. The project includes Intelligent Transportation System (ITS) improvements including new signage and infrastructure to accommodate future Automatic Vehicle Locator (AVL) systems, real time bus schedule information, centralized bus dispatch, operational controls, and centralized traffic controls. The project will be constructed in two stages: stage one started Fall 2006 and included road work and relocation of bus stops, stage two is the construction of the new transit center and began Fall 2008.

ESTIMATED SCHEDULE

The project is under construction. The estimated completion date of the transit center has been delayed from June 2011 to December 2011. The Gene Lynch Urban Park and decommissioning of the interim operating site (IOS) will be completed in FY12.

COST CHANGE

Cost change of $3,050,000 resulting from permitting and utility approval delays in relocating major utility lines including WSSC pipes and an existing PEPCO duct bank. In addition, the contractor experienced extreme difficulty with the installation of foundation caissons in rock which added to the the delays. The project schedule delay requires an additonal six months funding for construction administration, architecture/engineer fees, office rental, Van-Go costs, and maintenance of the Interim Operations Site (IOS). Additional staff were also hired to oversee the project and prevent further cost overruns. Additional cost of $200,000 due to buildout of Transit Commuter store not previously included.

JUSTIFICATION

With over 1,250 bus movements per day, the Silver Spring transit center has the highest bus volume in the Washington metro system. The Silver Spring transit center is a major contributor to the vitality of Silver Spring. There are various existing transit modes at this location although they are poorly organized. Patrons are exposed to inclement weather conditions and interconnectivity between various modes of transportation is poor. There is no provision for future growth and future transit modes. The current facility accommodates approximately 57,000 patrons daily, which is expected to increase by 70 percent to 97,000 by year 2024. The project enhancements will be an urban park and connections to hiker/biker trails. The benefits will be improved pedestrian circulation and safety in a covered facility, and reduced pedestrian conflicts with vehicle movements. All associated trails will be enhanced and new signage will be installed. This project will complement the completed facility of the relocated MARC station and the bridge over CSX and Metro track.

APPROPRIATION AND EXPENDITURE DATA

Date First Appropriation	FY99	($000)
First Cost Estimate Current Scope	FY12	98,846
Last FY's Cost Estimate		95,596
Appropriation Request	FY12	3,250
Supplemental Appropriation Request		0
Transfer		0
Cumulative Appropriation		95,596
Expenditures / Encumbrances		85,262
Unencumbered Balance		10,334
Partial Closeout Thru	FY09	0
New Partial Closeout	FY10	0
Total Partial Closeout		0

COORDINATION

CSX Railroad
Federal Transit Administration
Intersection Improvement Project
Maryland Transit Administration
State Highway Administration
Maryland-National Capital Park and Planning Commission
Department of Permitting Services
WMATA
Department of Transportation
Department of General Services
Department of Technology Services
Silver Spring Regional Services Center
Department of Police
WSSC
PEPCO

MAP

See Map on Next Page

FISCAL NOTE

The full cost of this project has increased to $101,438,000 - which includes Federal and State aid in the amount of $2,592,000 for State of Maryland expenses for planning and supervision (that funding is not reflected in the expenditure and funding schedules of the PDF).

OTHER DISCLOSURES

- A pedestrian impact analysis has been completed for this project.
- The Executive asserts that this project conforms to the requirements of relevant local plans, as required by the Maryland Economic Growth, Resource Protection and Planning Act.

Gazette.Net
Maryland Community News

Published: Wednesday, January 11, 2012

Silver Spring Transit center opening derailed again *by Kristi Tousignant*

Staff Writer

The Silver Spring Transit Center will open six months later than scheduled, marking the latest in a series of delays on the transportation hub.

The transit center, which began construction in September 2008 and was scheduled to open in January, likely will not be completed until this summer, said David Dise, director of the Montgomery County Department of General Services.

The $95 million project will connect bus, Metrorail, MARC trains, pedestrians and bikers in a three-story complex.

The center, which is located near the Silver Spring Metrorail station on the corner of Wayne Avenue and Colesville Road, now is scheduled to open about a year after it originally was slated to be complete in June 2011.

The opening was delayed six months last year after utility lines had to be relocated during the early part of construction, Dise said.

Plans for a winter opening were derailed after developer Foulger-Pratt discovered the concrete coating the reinforcing bars on the upper deck was not thick enough, Dise said.

In eight places, the concrete covering the bars, which are the bones of the structure, is only an inch or less thick. It should be two inches thick, Dise said.

This does not create a structural problem because the concrete is of an extra high strength, although a thicker layer is needed to protect the bars from the elements.

"We don't want the rebars to rust," Dise said.

William Tell, 42, of Silver Spring said the long construction period has been inconvenient for residents, especially those walking to the Silver Spring Metrorail Station.

Tell lives near the corner of Silver Spring Avenue and Fenton Street and walks to the Metrorail station every morning to commute to work.

Construction closed off access to a pedestrian path from Bonifant Street to the station, forcing Tell to take a more circuitous route. This has added about five to seven minutes to his daily walk, he said.

"My biggest complaint is that it's taking so long to complete this," Tell said. "It looks like it's going to be a long winter of long winter walks."

Workers discovered the concrete problems at the end of November, noticing the thinner concrete layers already had started to crack and flake, Dise said.

Foulger-Pratt brought in a contractor to X-ray the slabs of concrete to find the thin areas. The county, the Washington Metropolitan Area Transit Authority, the Maryland Transit Administration and the developer are deciding how to fix the problem, Dise said.

No one is sure who or what caused the error, but Dise said they are looking into it.

"The key right now that we are focusing on is how to fix it," Dise said. "No matter what the fix is, Foulger-Pratt is paying for it. The cause is not as important as the cure."

Foulger-Pratt officials could not be reached for comment.

Foulger-Pratt officials have said they can simultaneously remedy the situation and complete the rest of the work on the structure, Dise said.

"That could be the one variable on the schedule for completion," Dise said.

Workers just started installing 6-foot wide duct pipes in the lower level of the garage and the facility just started receiving partial power, Dise said.

Crews still must pour concrete slab on the walkways on the lower level and complete the glasswork over the upper level and pedestrian walkways.

Plans for the center include an urban park that will have a bike station. The park might not be completed when the structure opens, Dise said, adding that the center can open while work is completed on the park.

If the concrete problem can be corrected while other work is ongoing, construction should be complete in April, Dise said. After that, there is a 60-day time frame for inspection, allowing for a summer opening.
ktousignant@gazette.net

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The Washington Post

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Silver Spring transit center delayed indefinitely

By Victor Zapana, Published: January 13

The structural issues that have slowed construction of a massive new transit hub in Silver Spring are more serious than Montgomery County officials suspected, they said Friday.

County Executive Isiah Leggett (D) said earlier this week that the opening of the Silver Spring Transit Center had been pushed back to June and that the county expected the cost of the project to reach $101 million. But officials now say that they don't know when they will be able to open the facility, which is to bring Metro, MARC, Ride On, taxis and intercity buses to a single site in Silver Spring's revitalized downtown.

The facility's structural integrity had already emerged as a concern, and an engineer's assessment delivered to the county Friday concluded that at least some of the cement was improperly poured and must be redone.

"They're out of compliance of the WMATA standards," said David E. Dise, the county's general services director, referring to the Washington Metropolitan Area Transit Authority. "It is not even in compliance with industry standards."

Dise declined to provide the engineer's report, saying that it had not been reviewed by WMATA, the Maryland Transit Administration or the Federal Transit Administration.

Facchina Construction, a La Plata-based subcontractor that was in charge of pouring the cement, and

Foulger-Pratt, the Rockville-based general contractor for the transit center project, did not respond Friday to requests for comment.

A consulting group hired by the project's engineer, Parsons Brinckerhoff, will assess the hub so county officials can determine how to fix the cement problem. Dise said he did not know how long the study would take.

Initial concerns were related to several locations on the third level, where cement covering the facility's reinforced steel structure was determined to be too thin and could degrade over time, leaving the steel exposed and threatening the integrity of the building.

Now, Dise said, the county has found that the problems are more serious and that the facility needs "major repairs."

Dise said earlier this week that after construction is completed, county officials will examine what, if anything, went wrong. He said that Foulger-Pratt would provide any additional funding needed to fix the cement problem.

FOULGER-PRATT

WE BUILD TO LAST

VIA HAND DELIVERY

March 15, 2012

James A. Stiles, P.E.
Contract Administrator
Department of General Services
Montgomery County Maryland
101 Monroe Street, 11th Floor
Rockville, Maryland 20850

Re: **FPC Response to County Letter Dated February 14, 2012**
Part One: Structural Evaluation and Plan
Silver Spring Transit Center (SSTC)
Contract No. 7504510123-AA

Dear Mr. Stiles:

Enclosed please find Part One of the response of Foulger-Pratt Contracting, LLC ("FPC") to Montgomery County's (the "County") letter dated February 14, 2012 which set out the County's position regarding certain alleged "deficiencies" in the concrete construction on the 330 and 350 levels of the Silver Spring Transit Center.

This Part One of FPC's response includes (i) FPC's Structural Evaluation and Plan with an accompanying exhibit (Tab 1) and (ii) a letter from FPC's subcontractor, Facchina Construction Company (Tab 2), providing further detail relating to the specifics of FPC's Plan. Part Two of FPC's response is a letter dated March 15, 2012 from John Barron to James A. Stiles, P.E., submitted simultaneously under separate cover, which includes FPC's response to certain legal and contractual assertions in the County's February 14, 2012 letter.

Sincerely,

John Barron
President

cc: Ernest G. Lunsford, P.E. (via hand delivery)
Donald Scheuerman (via hand delivery)
Frank Roberts, P.E. (via hand delivery)
John Markovs, Esquire (via hand delivery)

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SIMPSON GUMPERTZ & HEGER
Engineering of Structures
and Building Enclosures

14 March 2012

Judah Lifschitz, Esq.
Shapiro, Lifschitz & Schram, P.C.
1742 N Street, NW
Washington, DC 20036

Project 120051 – Structural Investigation of Silver Spring Transit Center, Silver Spring, MD

Dear Mr. Lifschitz:

Shapiro, Lifschitz & Schram, P.C. (SLS) requested that Simpson Gumpertz & Heger Inc. (SGH) provide this Executive Summary of our structural investigation of the Silver Spring Transit Center in Silver Spring, Maryland. This report presents our structural evaluation and a recommended plan.

1. INTRODUCTION

1.1 Background

The Silver Spring Transit Center is a cast-in-place, post-tensioned concrete structure consisting of an at-grade bus transit level (Level 305), an elevated bus transit level (Level 330), and an elevated vehicular level for Kiss-and-Ride, taxis, drop-offs, etc. (Level 350). Subsequent to construction of the elevated levels, Montgomery County alleged that portions of these elevated levels are deficient in thickness and concrete cover. Parsons Brinkerhoff (PB), the Structural Engineer of Record, conducted a strength evaluation of certain existing structural components at "thin" areas (categorized by Montgomery County as less than 9-3/4 in. thick) of the Level 330 and the Level 350. PB identified certain alleged strength deficiencies and certain alleged service-level stress deficiencies in the one-way concrete slabs compared to their original design (PB Memorandum dated 20 January 2012). Montgomery County directed Foulger-Pratt Contracting (FPC), the General Contractor, to submit a detailed remediation plan to restore the allegedly deficient areas to conformance with the Contract Documents.

1.2 Objective

SLS retained SGH to conduct a structural investigation to determine whether the allegedly deficient areas of one-way concrete slabs require remedial action, and if so, to assist in the preparation of a detailed plan.

1.3 Scope of Work

SGH's investigation included, but was not limited to, the following tasks:

- Review project documentation that includes, but is not limited to, Contract Documents (technical specifications and drawings), modifications to Contract Documents, approved submittals for concrete mix design, post-tensioning reinforcement, and mild steel reinforcement, and concrete quality assurance reports prepared by The Robert B. Balter Company.

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- Review investigative documentation by others that includes, but is not limited to, 12 January 2012 and 20 January 2012 memoranda prepared by PB, ground penetrating radar images identified as Appendices A and B prepared by ADOJAM (undated), ground penetrating radar images and processed data prepared by Pennoni Associates Inc. (November 2011), survey data collected and processed by Greenhorne & O'Mara, Inc. (November 2011), survey data collected and processed by WMATA (August 2011), elevation, survey data collected and processed by Facchina Construction Company (August 2011), a petrographic evaluation of hardened concrete samples prepared by CTL Group, Inc. (CTL) dated 2 March 2012, and a report on service life engineering prepared by Tourney Consulting Group, LLC (TCG) dated 14 March 2012.

- Conduct a survey of three of the areas of the Level 330 slab alleged to be deficient using ground penetrating radar.

- Perform a structural evaluation of the elevated slab areas identified by PB to have strength deficiencies and stress deficiencies compared to their original design.

- Consult with TCG regarding service life engineering for both the "Specified" and "As-built" concrete mix designs.

The work presented in this report does not address the new content of PB's Evaluation of Silver Spring Transit Center Varied Slab Thickness Conditions Using Original Design Loading and Load Factors dated 27 February 2012, which FPC received on 8 March 2012.

2. SGH STRUCTURAL EVALUATION

2.1 General

As a matter of well-established engineering practice, the process of conducting a structural evaluation of an existing structure differs from that used in developing a new structural design. The purpose of a structural evaluation is to render conclusions regarding the adequacy of an existing component, assembly, or structure for its intended purpose. The investigator of an existing structure must apply sound engineering judgment regarding the anticipated structural behavior, the application of structural engineering principles and analytical procedures, and the significance of the results. A designer of a new structure often uses a prescriptive approach that includes simplifications and approximate analyses intended to make the design process more efficient. Applying this approach to a structural evaluation of an existing structure, such as the Silver Spring Transit Center, unnecessarily underestimates the actual load-carrying capacity.

When a concrete structure or portion of a concrete structure requires an investigation to evaluate whether it satisfies the requirements of American Concrete Institute 318 – *Building Code Requirements for Structural Concrete Buildings (ACI 318)*, the provisions of Chapter 20 provide the engineer with an investigative approach. Provisions 20.1.2 and 20.2 of ACI 318-2011 apply to the Silver Spring Transit Center. The former provision provides for an analytical evaluation of strength to be conducted using measured (quantified) dimensional properties, such as concrete dimensions, reinforcement size and placement, and material properties, including concrete strength. When such dimensional and material properties are obtained, the latter provision provides for an analytical evaluation shall be conducted with modified strength reduction factors that represent increased values compared to the strength reduction factors used in the design process.

2.2 Methodology

2.2.1 Analysis

The design of one-way, post-tensioned slabs is executed using structural demands determined by the theory of elastic analysis. The designing engineer typically calculates the structural demands using a two-dimensional, elastic analysis method, and uses a one foot wide unit strip of slab for the analysis and design. For a slab designed for uniform loads, this approach is straightforward. However, when designing a slab for concentrated loads, such as the Silver Spring Transit Center, the designing engineer must use an approximation for the effective width of slab that will resist the concentrated loads.

The structural demands on the elevated slabs at the Silver Spring Transit Center are dominated by the concentrated loads in drive areas imposed by the specified AASHTO HS25-44 loading (HS25 loading) with a 33% impact factor. As such, we conducted our structural evaluation of the slab using a three-dimensional, finite-element analysis with plate elements, rather than a two-dimensional analysis with an approximate effective width of slab. The finite-element analysis captures the overall behavior of the assembly.

Our structural model consisted of three structural bays of post-tensioned slabs, post-tensioned beams, and post-tensioned girders. We used geometric properties and reinforcement details shown on the structural drawings for the beams and girders. We used geometric properties and reinforcement details for the slab sections under evaluation using field-obtained information (Section 2.2.3 discusses this information) and effective post-tensioning forces per the slab schedule on the structural drawings.

We performed our analysis using RAMConcept V.8i (r4.1.2).

2.2.2 Material Properties

Provision 20.2.3 of ACI 318-2011 states that an estimate of the equivalent compressive strength of the existing concrete can be obtained by either cylinder or core test data. The strength evaluation should consider the concrete strength so that efficient use of construction materials is achieved. Using this approach, we calculated an equivalent compressive strength of 11,000 psi using the 56-day cylinder results. Use of the 56-day cylinder results is appropriate because application of the design loading has not occurred, and both ACI and AASHTO recognize the use of mature strength when components will receive loads at times appreciably later than 28 days after placement as is the case at Silver Spring Transit Center.

Our strength evaluation uses the specified material strengths for mild steel reinforcement and post-tensioning strands rather than determining these material properties by testing as permitted in Provision 20.2.4 of ACI 318-2011.

2.2.3 Dimensional Properties

Provisions 20.2.1 and 20.2.2 of ACI 318-2011 require dimensions of structural components and locations of reinforcement to be determined at critical sections. We obtained geometric properties and reinforcement details for the as-built slab using ground penetrating radar to survey slab areas at critical sections within the drive lanes in locations identified by PB as Areas 1, 2, and 3 (PB Memorandum dated 20 January 2012). We incorporated this field-obtained information into our structural model. For comparative purposes to the work prepared by PB, we modeled variations in geometry and reinforcement using the information obtained at ends and midspan of each slab section.

2.2.4 Slab Strength

Our strength evaluation of the concrete slab is made in accordance with the ultimate strength procedures of ACI 318-2011. Load combinations used to evaluate the structural demands on the concrete slab are in accordance with ACI 318-2011. Design strengths use modified strength reduction factors from Provision 20.2.5 of ACI 318 – 2011. We calculated strengths at critical sections of slab (negative flexure and positive flexure) within the drive lanes in PB Areas 1, 2, and 3 for "thin" areas (PB Memorandum dated 20 January 2012).

2.2.5 Slab Stress at Service Loads

Our evaluation of service level stresses is made in accordance with the procedures of ACI 318-2011 and considered an equivalent compressive strength of 11,000 psi.

Post-tensioned concrete slabs are classified based on the maximum tensile stress in the concrete considering service loads. Slabs are classified in Provision 18.3.3 of ACI 318-2011 as follows: Class U (uncracked) when the maximum tensile stress is less than or equal to 7.5 times the square root of the compressive strength of the concrete ($7.5\sqrt{f'_c}$); Class T (transition between uncracked and cracked) when the maximum tensile stress is greater than $7.5\sqrt{f'_c}$ and less than or equal to $12\sqrt{f'_c}$; and Class C (cracked) when the maximum tensile stress exceeds $12\sqrt{f'_c}$. We highlight a few comparisons of Class U and Class T slabs.

- Neither Class U nor Class T slabs require special provisions for crack control.
- Class T slabs in exposure conditions with freezing-and-thawing and deicing chemicals require specified concrete cover of 1.5 in. (Provisions 7.7.2 and 7.7.6.1 of ACI 318-2011).

We calculated service level stresses at critical sections of slab within the drive lanes in PB Areas 1, 2, and 3 for "thin" areas (PB Memorandum dated 20 January 2012).

2.3 Structural Evaluation

2.3.1 Structural Loads

We obtained load input files from PB's analysis (ADAPT-PT software) that show three loading configurations used in their analysis. Doug Lang at PB told us that these three loading represent the critical load configurations from their original design and their subsequent analysis of existing conditions. The three loading configurations for superimposed live loads are summarized as follows:

- Sidewalks loaded with full pedestrian load of 150 psf. Four drive lanes occupied by an HS25 loading centered in each of the slab spans. Live load skipping (live load patterning) is used to determine the maximum flexural demands in the slab sections.
- Sidewalks loaded with full pedestrian load of 150 psf. Four drive lanes occupied by HS25 loadings. Outer drive lanes have HS25 loading to the outsides of each lane. The center two lanes have HS25 loading positioned toward their common central beam. Live load skipping (live load patterning) is used to determine the maximum flexural demands in the slab sections.
- Sidewalks loaded with full pedestrian load of 150 psf. Four drive lanes occupied by HS25 loadings. HS25 loadings in the first and second lanes are placed toward their common beam. HS25 loadings in the third and fourth lanes are placed toward their common beam.

Live load skipping (live load patterning) is used to determine the maximum flexural demands in the slab sections.

We used the envelope solution technique in RAMConcept to pattern the live loads, which is similar to the live load skipping option used by PB. Where the structural demands on a component result from multiple concurrent HS24 loadings, a reduction factor on the structural demand is permitted by AASHTO to reflect the probability of coincident maximum loading. The reduction factors are 0.90 for three concurrent drive lanes and 0.75 for four drive lanes. Our current analysis did not take advantage of this reduction factor, as the envelope solution technique in RAMConcept does not readily permit its application.

Superimposed dead loads included unbonded topping slabs for the sidewalks and an allowance for a future unbonded topping slab in the drive lanes. We noted that the magnitudes of the superimposed dead loads shown in the PB load input file are larger than the nominal 6 in. sidewalk slab and 2 in. topping would suggest. For comparative purposes to the work prepared by PB, we chose to use the superimposed dead loads from PB's input file.

2.3.2 Results

2.3.2.1 Slab Strength

Our evaluation showed the calculated as-built flexural strength at slab critical sections in the drive lanes in PB Areas 1, 2, and 3 for "thin" areas exceed the factored flexural demands. We did not use moment redistribution in our evaluation.

2.3.2.2 Slab Stress at Service Load

Our evaluation showed the calculated service-level stress at as-built slab critical sections in the drive lanes in PB Areas 1, 2, and 3 for "thin" areas are at or below the criteria of $7.5\sqrt{f'_c}$. Therefore, the slabs are classified as Class U.

3. COMPARISON TO PB EVALUATION

3.1 Strength

In their 20 January 2012 memorandum, PB concluded that sections of existing slab at Level 330 and Level 350 are allegedly deficient for strength at negative flexure sections (slab sections at the face of beams) by 9% and 15% respectively. PB conducted their structural evaluation of the existing structure without consideration of the entirety of Provision 20.2 of ACI 318-2011 and using historical load factors that are unnecessarily higher than required. We offer the following context on the impact of their decisions:

- PB's decision to use the specified concrete strength of 8,000 psi rather than an equivalent compressive strength of the existing concrete of 11,000 psi from ACI 318-2011 Provision 20.2.3 underestimates the flexural strength of the slab by about 3%.

- PB's decision to use a strength reduction factor for flexure of 0.9 from design procedures instead of the modified strength reduction factor of 1.0 from ACI 318-2011 Provision 20.2.5 underestimates the flexural strength of the slab by about 11%.

- PB's decision to use historical load factors of 1.4 on dead loads and 1.7 on live loads instead of 1.2 on dead loads and 1.6 live loads, which ACI 318 adopted in 2002, overestimates the factored structural demands by about 7%.

- PB's decision not to use moment redistribution, which is provided for in ACI 318-2011 (Provisions 8.4 and 18.10.4) to reduce (or increase, if applicable) factored negative flexural demands by considering the ductility of the reinforced concrete section, results in an overstatement of reported strength deficiencies.

Given the results of our analysis, we expect that a structural evaluation of PB Area 4 on Level 330 and PB Area 1 on Level 350 would show adequate strength results given the context of our work to date.

Although not applicable to the "thin" areas under evaluation, we conducted a sensitivity analysis to determine whether 12 in. thick areas of the slab, which have reinforcement located in the design positions for a 10 in. thick slab, present a concern to the structural adequacy of the slabs. Our sensitivity analysis showed that such a thickened slab is adequate for strength and service-load stresses, and therefore is not of concern.

3.2 Stress at Service Loads

PB concluded that sections of existing slab at Level 330 experience service level stress in excess of a limiting value of $6\sqrt{f'_c}$, considering the specified concrete compressive strength of 8,000 psi. We offer the following context regarding PB's stress evaluation:

- In 2002, ACI 318 adopted the classifications of Class U, Class T, and Class C for prestressed (post-tensioned) flexural components. The classification of Class U with a limiting tensile stress of $7.5\sqrt{f'_c}$ replaced the earlier criteria of $6\sqrt{f'_c}$.

- PB's decision to use the specified concrete strength of 8,000 psi with the $6\sqrt{f'_c}$ criteria underestimates the limiting criteria between Class U and Class T by about 46% compared to an equivalent compressive strength of the existing concrete of 11,000 psi and $7.5\sqrt{f'_c}$.

We analyzed PB's original structural design using ADAPT-PT 2010 (Build 2010.2) with PB's input load files. We found service level stresses exceeded PB's stated $6\sqrt{f'_c}$ criteria with the specified compressive strength of 8,000 psi.

Given that there are no special provisions for crack control for Class U and Class T slabs, and ACI 318-2011 provisions only require an increase in specified cover from 1 in. for Class U to 1.5 in. for Class T, the evaluation of service stress should not be restricted to limiting tensile stress for Class U as related to durability.

4. EXAMINATION OF HARDENED CONCRETE CORE SAMPLES

CTL examined thirteen concrete core samples extracted from the Level 330 and Level 350 slabs. CTL concluded the following regarding durability:

- The near surface (10 to 30 mm) of the concrete cores exhibited a reduction in air content which is to be expected with the finishing procedures used on the project.

- This reduction in air content of the near surface may cause a reduction in the freeze-thaw durability and the manifestation of distress if concrete surface remains saturated.

- With proper maintenance and reapplication of an appropriate sealer, the effects of the compromised air void structure at the near surface will be mitigated.

5. SERVICE LIFE ENGINEERING

Tourney Consulting Group, Inc. (TCG) conducted service life engineering simulations considering a concrete mix design compliant with the technical specifications and the approved concrete mix design for the existing concrete. A copy of TCG's report to SLS is included in Appendix A.

The service life predictions focused on the time to corrosion, which marks the initiation of the corrosion process. The time of propagation, which represents the time it takes for expansive corrosion rust products to build up on the reinforcing steel, is a fixed period of 10 years to 20 years for epoxy coated reinforcement. The cumulative period for time to corrosion and time of propagation represent service life.

TCG's work showed the following:

- Concrete constructed in accordance with the Contract Documents, i.e., a concrete mix design compliant with the technical specifications and epoxy coated top reinforcement with cover of 1-5/8 in. which represents the specified cover minus permissible tolerance, has a time to corrosion of 47 years.

- The existing concrete constructed with the approved concrete mix design and epoxy coated top reinforcement with cover of 1-5/8 in. has a time to corrosion in excess of 100 years.

- The existing concrete constructed with the approved concrete mix design and epoxy coated top reinforcement with cover of 1 in. (91% of cover depths to top reinforcing bars from SGH surveyed "thin" areas had cover of 1 in. or more) has a time to corrosion of 54 years. The time to corrosion increases to 100 years with consideration of five applications of a 100% silane penetrating sealer on 10-year intervals.

- The existing concrete constructed with the approved concrete mix design and epoxy coated top reinforcement with cover of 3/4 in. (97% of cover depths to top reinforcing bars from SGH surveyed "thin" areas had cover of 3/4 in. or more – lowest recorded cover depth was 7/8 in.) has a time to corrosion of 78 years considering five applications of a 100% silane penetrating sealer on 10-year intervals.

TCG concluded that the existing concrete provides significantly better durability performance compared to a concrete mix design compliant with the technical specifications included in the Contract Documents. The improved durability performance compensates for reductions in cover.

6. CONCLUSIONS

Based on our work as set forth herein we conclude the following:

- Calculated as-built flexural strength at critical sections of slab in the drive lanes in PB Areas 1, 2, and 3 for "thin" areas of Level 330 exceed the factored flexural demands. Therefore, no remedial strengthening is necessary.

- Calculated service-level stress at critical sections of as-built slab in the drive lanes in PB Areas 1, 2, and 3 for "thin" areas of Level 330 are at or below the uncracked criteria of $7.5\sqrt{f'_c}$.

- By examination of our work to date, we expect similar results for PB Area 4 on Level 330 and PB Area 1 on Level 350.

- Reductions in concrete cover to reinforcement beyond permissible tolerance are compensated by the improved durability performance of the existing concrete constructed with the approved mix design. Routine applications of a 100% silane based penetrating sealer demonstrate a service life approaching or exceeding 100 years.

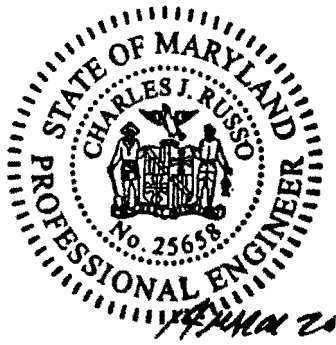
- Routine application of a silane penetrating sealer mitigates the reduction in near surface concrete durability identified by CTL.

7. RECOMMENDED PLAN

Our structural evaluation showed that the as-built slabs do not require remedial strengthening.

We recommend the routine application of a 100% silane penetrating sealer. The plan should include five applications of sealer at 10-year intervals, as contemplated in the TCG service life engineering, as well as intermediate 5-year testing for remaining sealer effectiveness. We recommend Hydrozo 100+ by BASF, or equal, for this application.

Sincerely yours,



Charles J. Russo, P.E.
Senior Principal
MD License No. 25658
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Encl.

Facchina
CONSTRUCTION COMPANY, INC.
P.O. Box 2286 • 102 Centennial Street • Suite 201 • La Plata, Maryland 20646 • (240) 776-7000 • Fax: (240) 776-7001

March 14, 2012

Mr. Brett Harton
Foulger-Pratt Contracting, LLC
9600 Blackwell Road
Suite 200
Rockville, MD 20850

RE: Silver Spring Transit Center
Owner Notice of Defective or Non-Conforming Work

Dear Mr. Harton:

I am writing in response to your February 14, 2012 letter which forwarded Montgomery County's (the "County") letter directing Foulger-Pratt Contracting, LLC to submit a remediation plan for alleged deficiencies in the deck thickness and rebar cover on the Silver Spring Transit Center. While we do not agree with all of the County's allegations, Facchina Construction Company ("Facchina") is prepared, as part of a resolution of this matter and at its sole cost and expense, to fully comply with the recommendations in the reports of Simpson Gumpertz & Heger ("SGH") and Tourney Consulting Group, LLC ("TCG") as detailed in Foulger-Pratt's Structural Evaluation and Plan. In summary, consistent with the SGH and TCG reports, this includes five applications of a 100% silane penetrating sealer at ten year intervals, with intermediate five year testing for remaining sealer effectiveness. Specifically, Facchina will do the following as part of a resolution of this matter:

1. Upon approval of Foulger-Pratt's Structural Evaluation and Plan, Facchina will subcontract with an approved specialty subcontractor for the application of a 100% silane penetrating sealer, such as Hydrozo 100 + (see attached data sheets), to all traffic bearing surfaces of the Level 330 and Level 350 slabs before Substantial Completion of the Project.

2. Five years from the initial application referred to in paragraph 1 above, Facchina will retain an engineering and/or testing company to conduct the qualitative testing for remaining sealer effectiveness. Facchina will submit a report setting out the results of this testing. In the unlikely event the testing indicates that the sealer needs application sooner than the ten year interval in

specific areas, Facchina will reapply the sealer as needed to provide similar service life equivalency to that anticipated in the TCG report.

3. In year ten and prior to the second application referred to in paragraph 4 below, Facchina will conduct qualitative testing for remaining sealer effectiveness as provided in paragraph 2 above. Facchina will submit a report with the results of this test.

4. In year ten and after the testing referred to in paragraph 3 above, Facchina will provide a second application of the sealer to all traffic bearing surfaces of the Level 330 and Level 350 slabs.

5. As to the remaining three applications and three intermediate tests, Facchina will not perform said applications and tests but rather, will pay Montgomery County an amount sufficient to cover the cost of performing the remaining applications and tests. The amount will be determined based upon the historical actual cost incurred for the sealer material, applications and tests incurred by Facchina during the initial ten year period.

6. Facchina will provide a warranty bond from a surety reasonably acceptable to Montgomery County in the amount of $500,000 to secure its performance of the obligations identified in paragraphs 1 through 5 above.

Facchina is available to meet with you, the County, and other parties to discuss this proposal and will cooperate fully to resolve this matter in a manner satisfactory to all concerned.

Sincerely,
FACCHINA CONSTRUCTION COMPANY, INC.

Paul V. Facchina, Sr.
President

Encl

FOULGER-PRATT

WE BUILD TO LAST

March 15, 2012

VIA HAND DELIVERY
James A. Stiles, P.E.
Contract Administrator
Department of General Services
Montgomery County Maryland
101 Monroe Street, 11th Floor
Rockville, Maryland 20850

Re: **FPC Response to County Letter Dated February 14, 2012**
Part Two: Response to Legal and Contractual Issues
Silver Spring Transit Center (SSTC)
Contract No. 7504510123-AA

Dear Mr. Stiles:

This letter is Part Two of the response of Foulger-Pratt Contracting, LLC ("FPC") to Montgomery County's (the "County") letter dated February 14, 2012 which set out the County's position regarding certain alleged "deficiencies" in the concrete construction on the 330 and 350 levels of the Silver Spring Transit Center ("SSTC" or the "Project"). Part One is FPC's Structural Evaluation and Plan submitted contemporaneously under separate cover.

I. Introduction

FPC firmly believes that it is in the best interest of all parties to achieve, promptly and expeditiously, an agreement on a reasonable engineering approach which (i) addresses the County's concerns and (ii) mitigates, to the greatest extent reasonably possible, the costs and potential impact to the Project. To that end, FPC has contemporaneously submitted under separate cover, Part One of its response which is a Structural Evaluation and Plan addressing the issues raised by the County. We believe that this Structural Evaluation and Plan presents a reasonable and practical approach in the best interests of all concerned. This will confirm FPC's request and the County's agreement that FPC will present its Structural Evaluation and Plan at a meeting next Thursday, March 22, 2012 at 9:30AM at FPC's offices, to the representatives of the County in this matter and the appropriate representatives and consultants of the stakeholder parties.

(18)

9600 Blackwell Road, Suite 200 ▪ Rockville, MD 20850
240 499 9600 ▪ 240 499 9601 fax ▪ www.foulgerpratt.com

II. Discussion of Contractual and Legal Issues

In addition to Part One of FPC's response, the Structural Evaluation and Plan, this letter will respond to certain legal and contractual assertions in the County's February 14, 2012 letter.

A. FPC Has Acted Timely

FPC disagrees with the County's assertion that FPC has not acted timely and reasonably in response to concerns raised by the County. Suffice it to say that there is a very detailed record which documents FPC's timely actions and responses and there is no need or benefit to reciting the entire record herein. By way of summary and example we point to the following events:

On September 22, 2011, the County provided FPC with results of its survey and directed FPC to submit a remediation plan and perform surveys of other areas. Even before receipt of the September 22, 2011 letter, FPC's subcontractor, Facchina Construction Company ("Facchina"), had commenced a broad survey of 330 level to determine the thickness of the slabs. The survey work on the 330 level was completed by September 19, 2011 and on the 350 level by September 26, 2011.

After completion of the Facchina survey, FPC, Facchina, the County, WMATA, MTA, representatives of Parsons Brinkerhoff ("PB"), the Engineer of Record, and others attended a meeting on September 26, 2012 during which it was agreed that the next step in the process was development of a comprehensive understanding of the nature and extent of the as built conditions through LIDAR and GPR surveys.

After discussion, MTA volunteered to have this survey performed. The parties agreed to wait for the results of the LIDAR and GPR surveys. The parties held weekly meetings at which the progress of the MTA survey was discussed. On November 3, 2011, FPC wrote to the County and confirmed that it would provide a plan within thirty days of completion of the surveys. [Exhibit 1]

The survey results were provided by the consultant at the end of November 2011. On November 30, 2011, another meeting was convened with all of the stakeholders to discuss the survey data. PB indicated that it required more GPR surveys. The parties agreed that after these additional surveys were completed, PB would evaluate the survey results and report back. During December 2011 and thereafter, FPC requested that the County and its engineers provide necessary data

and information required for FPC to evaluate the situation and contentions and respond as required by the County.

On December 27, 2011, even though PB had not completed the work that the parties had agreed would be done before further action was commenced and had not reported back the other stakeholders, the County wrote to FPC and gave FPC thirty days to provide a remediation plan. On January 20, 2012, PB issued a brief memo which discussed its structural evaluation as of that date. The PB memo did not include or attach data. By letter dated January 25, 2012, FPC responded to the County's December 27, 2012 letter and reiterated its need for the previously requested data and information in order to complete its evaluation and provide the requested plan. [Exhibit 2] Subsequent to that letter the County and PB provided, over time, certain outstanding information.

On February 14, 2012 the County issued the subject letter, directing FPC to provide a remediation within thirty calendar days. With its submission today FPC is providing its Structural Evaluation and Plan within the thirty day time period directed by the County.

Late last week, on Thursday, March 8, 2012 the County provided FPC for the first time with a document issued by PB dated February 27, 2012 entitled Evaluation of Silver Spring Transit Center Varied Slab Thickness Conditions Using Original Design Loading and Load Factors. While this document contained information previously disclosed to FPC, it also contained new information. FPC will supplement its Structural Evaluation and Plan as may be appropriate once it has had adequate time to review this new document.

Contrary to the County's allegations, FPC and Facchina have and will continue to take all necessary and reasonable steps to address these issues and to respond appropriately to the County's requests in a timely manner.

B. The County's Obligation to Provide Data and Information

FPC disagrees with the County's contention that the County has no obligation to provide FPC with (i) design basis assumptions and data; (ii) complete survey data and (iii) other analyses and requested data necessary for FPC to develop the requested response and plan. In addition to the various provisions of Article 10 of the General Conditions of Construction Contract regarding additional inspection and testing and the County's rights and obligations in connection therewith, Maryland law is clear that (a) "[w]here cooperation is necessary to the performance of a condition or of a promise, a duty to cooperate will be implied, and the party owing such duty

cannot prevail if his failure to cooperate hinders or prevents performance thereof" (Whitney v. Halibut, Inc., 235 Md. 517, 530 (1964)) and that (b) "[t]he implied duty of good faith prohibits one party to a contract from acting in such manner as to prevent the other party from performing his obligations under the contract." Mount Vernon Properties, LLC v. Branch Banking and Trust Company, 170 Md. App. 457, 472 (Md. Ct. of Sp. App. 2006).

C. There Has been No Impact to the Critical Path

FPC disagrees with the County's contention that the "magnitude of any correction or replacement" to remediate the County's concerns have to date affected, or will in the future affect, the critical path of the Project. As is clear from FPC's monthly schedule submissions the subject issues have had absolutely no impact to the critical path of the Project. Nor will the work proposed in our Structural Evaluation and Plan cause any negative impact to the critical path of the Project; provided that the County acts reasonably and promptly in its review and approval of our Structural Evaluation and Plan.

D. The County May Not Cause Economic Waste

Under well established Maryland law, there is no sustainable legal basis for the County's assertions that: (i) "FPC has an express contractual obligation to return the concrete elements to their design parameters – either through correction or replacement" and (ii) "The County will not accept any analysis which recommends leaving the defective concrete work "as is." To the contrary, Maryland law clearly does not permit the County to require "replacement" of the allegedly defective concrete work as the County asserts in its letter because FPC's proposed Plan properly, fully, and practically addresses all concerns raised by the County, avoids economic waste, assures no negative impact to the Project schedule, and provides a significant betterment to the County. We believe that FPC's proposed Plan clearly fulfills FPC's contractual and legal obligations to the County. The County's prompt acceptance of the proposed Plan will be in the best interests of the Project and all parties.

1. The County Cannot Require a Plan that Results in Economic Waste

The County's February 14 letter states that FPC's Plan must "restore the deficient areas to conformance with the Contract Documents." [page 5]. The February 14 letter further states, "the County will not accept any analysis which recommends leaving the defective concrete work 'as is.'" [page 2]. For the purposes of this discussion, we will assume that the County defines defective or deficient work as

a slab that is less than 9 3/4" in thickness, greater than 10 3/8" in thickness, and/or has cover over the rebar of less than 2".

As discussed below, FPC does not agree with the County's contention that all such concrete is not in conformance with the Contract Documents. Even if the County's contention was correct, the long-established case law on this subject is clear: If a completed structure is adequate for its intended purpose as constructed, the owner cannot require that it be removed and replaced if that causes an unreasonable economic waste, even if the work fails to meet the contract provisions. The owner must act in a reasonable manner in directing the repair procedures.

The seminal case on economic waste, Jacob & Youngs Inc. v. Kent, 129 N.E. 889 (NY 1921), was written by Judge Cardozo in 1921 in which the contract required Reading pipe to be installed in a house but the contractor installed Cohoes pipe. The court found that the Cohoes pipe was just as good as the Reading pipe. Justice Cardozo concluded that the remedy of replacing the pipe was inappropriate where the cost of completion was "grossly and unfairly out of proportion to the good attained." Jacob & Youngs at 891.

In Granite Construction Company v. United States, 962 F.2d 998 (Fed Cir. 1992), cert. denied, 113 S. Ct. 965 (1993), the contractor installed waterstop in a concrete lock and dam. The strength and other properties of the installed waterstop were well below the contract requirements. However, the installed waterstop exceeded the safety margin for the dam and "was adequate to serve its intended purpose." The U.S. Court of Appeals for the Federal Circuit found that the directive to remove and replace the waterstop resulted in an unreasonable economic waste, and therefore, the contractor was entitled to recover its additional costs to remove and replace the installed waterstop, even though it had failed to meet the specified contract requirements. Nor was the owner entitled to diminution in value of the structure because the installed waterstop was adequate for its intended purpose.

Maryland has long recognized and applied the economic waste doctrine. The Maryland Court of Appeals in Andrulis v. Levin Constr. Corp., 628 A.2d 197, 205 (1993) stated as follows:

> Sometimes the defects in a structure cannot be physically remedied without tearing down and rebuilding. In many such cases, the structure as it exists, even though it is not exactly in accordance with the contract requirements, is such that it will render substantially all the service that the

> structure contracted for would have rendered; and reconstruction and completion in accordance with the contract may be possible only at a cost that would be imprudent and unreasonable. The law does not require damages to be measured by a method involving such economic waste.

See also Reutemann v. Lewis Aquatech Inc., No. Civ. A. DKC2004-0063, 2005 WL 1593473 (D. Md. July 5, 2005); Safer v. Perper, 569 F.2d 87, 99-100 (D. D.C. 1977); Hooton v. Kenneth B. Mumaw Plumbing and Heating Co., Inc., 271 Md. 565, 574 (1974).

Here, the County cannot ignore this well established precedent and demand that the structure be rebuilt to the precise parameters specified in the Contract Documents because the structure as constructed (and as improved by the application of a silane sealer under the FPC Structural and Evaluation and Plan) is clearly adequate for its intended purpose and to re-build it would result in an unreasonable and legally unsustainable economic waste. The County is obligated to weigh the impact of the alleged defects to the structural integrity or durability of the structure against the cost of re-building it to the condition allegedly required by the Contract and the County must act reasonably in reviewing the FPC Structural and Evaluation and Plan and moving it forward.

2. **The Allegedly Thick Slabs Meet the Contract Requirements and Do Not Require Remediation**

The County alleges that any slab that is more than 10 3/8" is too thick; does not comply with the Contract requirements; and requires correction or replacement. The County relies on (i) the designation of a 10" slab on the Contract drawings, and (ii) the 1990 edition of ACI 117 which specifies a tolerance for concrete slab thickness to be –1/4" and +3/8".

We do not agree with the County's position. The County does not consider the express provisions of Note 5 on Drawing S1.00 under Section F, CONSTRUCTION, which states as follows:

> STRUCTURAL MEMBER SIZES (**SLAB THICKNESS** AND BEAM DEPTH) SCHEDULED ARE THE **MINIMUM** REQUIRED DESIGN SIZES. **ADDITIONAL THICKNESS OF CONCRETE** REQUIRED FOR ALL LOCAL SLOPING OF CONCRETE SHOWN ON STRUCTURAL DRAWINGS OR ARCHITECTURAL DRAWINGS, SHALL BE PLACED

IN THE SAME OPERATION AS STRUCTURAL MEMBERS [Exhibit 3]. [Emphasis added]

This Note clearly states that the 10" dimension is only a "minimum" and that there are areas where the slab thickness is more than the "minimum" ten inches. Facchina reasonably interpreted the Contract in accordance with this note when it placed the slabs. While Facchina generally intended to place 10" thick slabs, it did not understand the Contract to impose a maximum thickness limitation, and neither the County nor its engineers ever suggested that there was such a limitation.

Further, the contractual design itself contemplates slabs thicker than 10 3/8" in the center of the drive lanes. In response to RFI 216, the County provided information on the camber for the top surface of the slab. The RFI states "[o]n the S2.01 plan, the top of slab elevations at the center of the bus drive areas, are generally valid and document the top of the upwardly cambered slab surface...." [Emphasis added]. [Exhibit 4]. The note refers to the "slab surface" being cambered - not the underside of the slab or the slab itself. Further, the drawing provided with the RFI shows a single line, i.e., the slab surface, having the camber. In addition, the drawings for the concrete do not designate an elevation for the underside of the slab – nothing is shown. However, Drawing A3.30 shows a cambered top of slab and no camber in the bottom of the slab. [Exhibit 5]. If the top of slab is cambered in the middle and the bottom of the slab is not cambered (in accordance with the referenced drawings), the slab will necessarily be greater than 10 3/8" in the middle of the roadway by design.

Finally, because of the complicated construction joint arrangement depicted in RFI 571, the slab was thickened to accommodate the post tension stressing details.

Thus, a full review of the contractual design of the SSTC reveals that, as designed, the inclusion of slabs greater than 10 3/8" thick was contemplated and, therefore, in compliance with the requirements of the Contract.

Moreover, as more fully set forth in FPC's Structural Evaluation and Plan, no demolition or other "remediation" can reasonably be required of the slabs thicker than 10 3/8", even if such slabs were determined not to conform to Contract requirements. As the Structural Evaluation and Plan proves, the additional thickness of the slabs does not present a concern as to the structural adequacy of the slabs. For example, the addition of concrete load due to the increased thickness is de minimus in comparison to the loads applied to the slab by the buses. The loads from the slab weight are not a significant portion of the design loads of the SSTC and thus, additional

slab thickness has no impact on the integrity of the structure. Further, the thicker sections fully comply with today's design standards because the 2010 edition of ACI 117 deletes the plus tolerance. [Exhibit 6].

Therefore, assuming arguendo that the concrete is thicker than that permitted by the Contract, a direction to remove the excess concrete will result in an unreasonable economic waste and is not permitted as a matter of well established Maryland law.

3. **The Allegedly Thin Slabs Do Not Require Remediation**

Again relying on the 1990 edition of ACI 117, the County alleges that any slab that is less than 9 3/4" is too thin and does not comply with the Contract requirements.

As evidenced by the accompanying Structural Evaluation and Plan, the slabs as constructed -- even where they are less than 9 3/4" thick -- meet the requirements of ACI 318 and are adequate for their intended purpose. There is no structural deficiency resulting from the decreased thickness. As a result, any substantial corrective action required would constitute an unreasonable economic waste.

4. **The Areas of Reduced Cover Are Addressed in FPC's Structural Evaluation and Plan**

In support of its contention that the Contract requires 2" of cover in all locations, the County cites: (i) Note E7 on Contract drawing S1.00 for the proposition that the top of the rebar shall be 2" clear from the top surface of the concrete and (ii) Contract drawings S4.02 and S4.03 as specifying the top of slab to the center of the post-tensioning strands at the supports to be 2.5". However, ACI 117, paragraph 2.2.2 allows a 3/8" tolerance for cover over the top of the rebar. [Exhibit 7] Thus, the cover required by the Contract Documents is 1 5/8" and not 2" as contended by the County.

As further discussed in detail in FPC's Structural Evaluation and Plan, FPC and Facchina provided a concrete mix with significantly better durability characteristics than an alternate concrete mix design compliant with technical specifications included in the Contract Documents. Thus, the County obtained a significant betterment with respect to durability and protection against chloride migration. As is presented in our Structural Evaluation and Plan, the mix design allowed in the Contract prevents the start of corrosion for forty-seven years with a 1 5/8" cover, whereas the mix design provided by FPC prevents the start of corrosion in excess of 100 years with the same 1 5/8" cover. Thus, the concrete as built actually has far

greater durability and capacity to prevent chloride migration than other concrete allowed by the Contract. The improved durability characteristics compensates for reductions in cover.

FPC's surveys as part of its Structural Evaluation and Plan indicate that ninety percent of the thin areas of the concrete have a cover of 1" or more. With the betterment provided by the actual mix design and a 1" thickness (90% of the thin areas), corrosion will not commence for fifty-four years (54), as compared to the forty-seven years (47) when corrosion will commence using a mix design allowed by the Contract.

The County contends that the Contract requires FPC to install a penetrating liquid floor treatment specified in paragraph 2.10.A.1 of Section 3300 to the roadway slabs and has directed FPC to do so. FPC has taken exception to this direction and regards it as a change to the Contract because: (i) nowhere does the Contract indicate that this product is to be applied to roadway slabs; to the contrary, the Finish Schedule requires application of this product to other specified areas but not to the roadway slabs; [Exhibit 8]; and (ii) as discussed in FPC's Structural Evaluation and Plan, the floor treatments listed in Paragraph 2.10 are proper for use as a floor hardener and for polished floors, but not for a roadway slab with a broom finish, such as the Silver Spring Transit Center. Thus, application of the specified product to the roadway surfaces is not a contractual requirement nor is it appropriate.

As further indicated in FPC's Structural Evaluation and Plan, the use of a silane sealer, such as Hydrozo 100+, as we have proposed, will further enhance the durability of the slabs and delay of the commencement of corrosion. If an appropriate silane sealer is applied to the existing concrete roadway slab, the start of corrosion in the thinnest areas with the lowest measured cover of 3/4" will not commence for seventy-nine (79) years.

In an effort to effectively address the County's concerns regarding areas with reduced cover, FPC and Facchina propose, as part of a resolution of this entire matter, that Facchina, at its sole cost and expense, will fully comply with the recommendations contained in FPC's Structural Evaluation and Plan and specifically in the reports of Simpson Gumpertz & Heger and Tourney Consulting Group, LLC. In summary, consistent with these reports this includes (i) five applications of a 100% silane penetrating sealer at ten year intervals; (ii) intermediate five year testing for remaining sealer effectiveness; and (iii) all obligations secured by a $500,000 surety bond. The specifics are discussed in FPC's Structural Evaluation and Plan.

Concern has been expressed verbally about the lack of air in the surface region of the concrete. However, the concrete and its installation fully complied with the specifications and this is not a basis for rejection. In any event, the CTL Report recommends that a sealer be applied every five years to overcome any such concerns. As stated in the Structural Evaluation and Plan, an appropriate interval for a silane sealer, such as the Hydrozo 100+, is 10 years. While the concrete meets the specification requirements, and FPC is not required by the Contract to apply a sealer, the proposal summarized above and discussed in FPC's Structural Evaluation and Plan is a betterment which addresses the concerns relating to durability by including performance of two sealer applications and tests and compensation to the County for three additional sealer applications and tests.

Foulger-Pratt has a long history of delivering high quality Projects to its clients in general and to Montgomery County in particular. Consistent with our record and business beliefs we have taken the County's concerns very seriously and expended every effort to achieve a proper and complete evaluation of the as built conditions and to provide a sound and practicable path forward based on solid engineering principles. We look forward to meeting with the County and stakeholders next Thursday to comprehensively present our Structural Evaluation and Plan and to engage in substantive discussions that will lead to the prompt resolution of these issues and concerns.

Sincerely,

John Barron
President

cc: Ernest G. Lunsford, P.E. (via hand delivery)
Donald Scheuerman (via hand delivery)
Frank Roberts, P.E. (via hand delivery)
John Markovs, Esquire (via hand delivery)