



Technical Proposal
**US 113 (Phase 3) -
From North of Massey Branch
To Five Mile Branch Road -
WO6365170**

Due: November 10, 2014



CENTURY
ENGINEERING

150 Lafferty Lane, Dover, Delaware 19901

Container 1 of 1

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Project Technical Elements & Approach



Project Technical Elements and Approach



PROJECT TECHNICAL ELEMENTS & APPROACH

George & Lynch, Inc. (G&L), in association with Century Engineering, Inc. (CEI), have thoroughly reviewed the project requirements for the US 113 (Phase 3) project and, per the RFP requirements under Section 2.09.02, our Team offers the below descriptions of the Technical elements proposed for meeting and exceeding the contract requirements.

Our project Team understands this project to include the final design and construction of approximately 3.58 miles of divided highway including driveways, access roads, and service roads utilizing the as-advertised pavement sections. Work will also include coordinating with the MD/DE railroad crossing reconstruction, relocation of utilities, finalization of the environmental permits and associated drainage improvements.

We have put together a strong Team that has a long history of working together on both Design/Build and more traditional Design/Bid/Build projects with success. Our history of working together, as well as our relationships with our DBE's and sub-contractors both in design and construction, has produced many successful projects and will continue to do so on this project.

The following outlines our Team's approach to this project as specified in the RFP:

Emergency Response

The G&L/CEI team understands the importance of maintaining access for Emergency Response within the project limits. With fire station locations both north and south of the project limits in Berlin and Snow Hill, we will be expecting fire and emergency responders to be accessing US 113 from both directions including response from the station in Newark. Maintaining access for these responders will be a multi-prong approach.

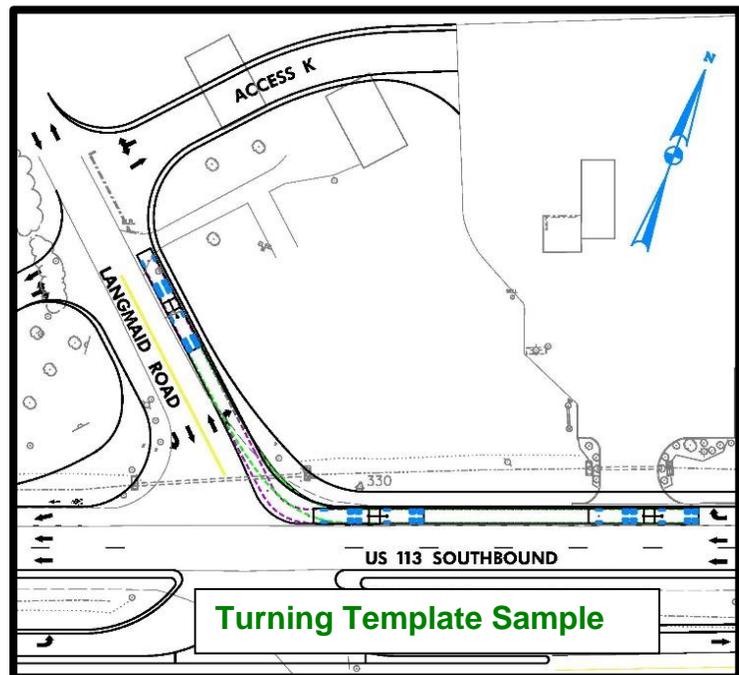
First, communicating with the respective emergency responders will be key in ensuring that access is maintained. We plan to reach out to the police, SHA District 1, Coordinated Highways Action Response Team (CHART), Maryland Emergency Management Agency (MEMA), the fire companies and other emergency services in the area during the final design and before construction begins to introduce the key staff and provide project schedule and contact information to those representatives. During these meetings, the project team will review the project details and discuss the concerns of the local emergency responders. *Establishing a line of communication early in the process will enable all parties to be aware of the needs of the surrounding community.* Protocols will be developed to determine the course of action to be taken when emergency response is needed within the work zone.

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In addition to these advance coordination meetings, we will keep the emergency agencies aware of the project schedule and anticipated work zones on a routine basis. The frequency of this communication will be discussed at the initial coordination meeting. Keeping the emergency responders abreast of the current work zones will allow them to plan their response routes and thereby minimize response times. We have used this approach on other corridor type projects with great success.

We have also utilized a system where our flaggers had access to the emergency responder's radio frequency which allowed them to know when a response was imminent. This allowed the flaggers to ensure that traffic was flowing in the direction required for the response. By keeping traffic flowing ahead of the responder's arrival, the response time will be minimized. Obtaining permission from the emergency responders to receive the radio frequencies will take coordination between the project team, the responders and the State. This will be something that we work to coordinate during the design period and during our coordination meetings. If the details are able to be worked out, having access to these radio frequencies will help to minimize the response time and maximize the safety of the responders, workers and the public through the work zone.

With the Newark Water Tower being located within the project limits, we understand the need to keep this accessible to the fire companies at all times. We will ensure that the access road to the water tower is open at all times.



We also understand that in addition to standard access being maintained for the water tower, access for specific types of emergency response vehicles must also be maintained. We will review, with the respective response teams, the specific vehicle requirements and then, using AutoTurn, design the temporary and permanent access to this site to accommodate the specified vehicles. We have successfully utilized AutoTurn to model and design entrances and access for all types of vehicles.

Our project team is aware that the US 113 corridor is an Emergency Evacuation Route. If the need for an evacuation route presents itself during the construction of this project we will work efficiently to close up the active work zone and to ensure that the route is clear for traffic. We will also work to ensure that all construction materials are secured so that there is no impedence to traffic during the emergency time. All project work will be suspended for the duration of the evacuation need or State of Emergency declaration. We will have message boards ready to place at the ends of the work zone to alert the travelling public to the

emergency road status. We have worked on several other projects within Emergency Evacuation Routes and have developed standard procedures that are initiated once an Emergency is declared. This again will be coordinated with the Emergency Responders and the project team.

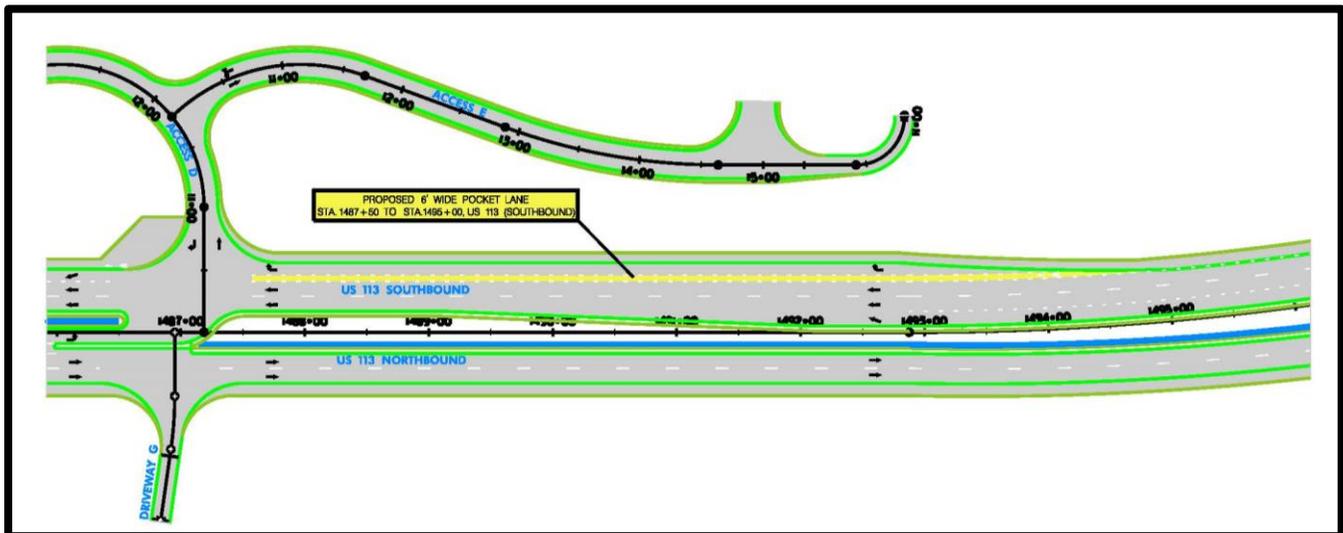
The G&L/CEI project team understands the importance of maintaining the access for the emergency responders within the project area as well as the importance of this corridor as an evacuation route. We will work to communicate with the area responders to ensure that their concerns are heard and addressed throughout the construction of this project.

Bicycle Accommodations

The G&L/CEI team understands the project to include bicycle accommodations within the project limits. The outside shoulder (both Northbound and Southbound) within the project limits will be marked for bicycle traffic. In addition, per our approved ATC (see Appendix A for approval letter), we will be revising the design to include pocket lanes at the following locations:

Sta. 1487+50 to Sta. 1495+00, US 113 SB approaching Access D

Sta. 1550+00 to Sta. 1556+65, US 113 SB approaching Newark Road



Addition of Pocket Lane Approaching Access D

The proposed 6' wide bicycle pocket lanes will keep the project in compliance with the current SHA Bicycle Policy & Design Guidelines, dated May 2013. In locations where acceleration/deceleration lanes were combined, no pocket lanes were added. Due to the multiple decision points for the bicyclist and motorists within these continuous auxiliary lanes and the anticipated speed of the vehicles, we recommend that the bicyclist remain on the shoulders in these scenarios.

In addition to the pocket lanes, the project team will be increasing the right paved shoulder from 6' to 8' as compared to the concept plans. **The increased shoulder width will allow for the placement of bicycle friendly rumble strips while providing the minimum 6' shoulder for the bicycle traffic.** By increasing the paved shoulder width adjacent to the auxiliary lanes, we will provide for the safety of the vehicles (rumble strips) along with the safety of the bicycles (full 6' shoulder provided).

Maximize Operations and Safety

Our project Team's goal is to ensure that the final roadway meets the needs of the owner and the travelling public for the foreseeable future. One way our Team proposes to maximize operations and safety is to extend the acceleration and deceleration lanes within the project limits which will increase the safety for the travelling public.

The 30% plans provided for various lengths of the auxiliary lanes. These lengths do not meet the recommended design criteria set forth in AASHTO for a 60 m.p.h. roadway and the respective entering or exiting conditions, though they did meet the criteria that was previously utilized on the US 113 corridor. We have determined areas where the lengths should be modified to meet current design criteria which will in turn provide for additional safety and maximize the efficiency of the roadway operations. These locations are better described below and shown on the construction plan sheets in Appendix B.

- Acceleration Lane – Sta. 1441+00 to Sta. 1449+50, Rt. Northbound

The location of the J-Turn/U-Turn has been revised to allow for the southern cross-over. The taper will be increased by approximately 100' while the length of the lane will not be changed. Moving this J-turn will allow for the transition back to a two lane roadway to occur at the Southern Tie-In.



Southern Tie-In Detail

- Acceleration Lane – Sta. 1467+00 to Sta. 1475+00, Rt. Northbound

An additional 100' will be added to this acceleration lane along with an additional 100' to the taper. This additional length will be added to exceed the project design standards while avoiding additional impacts to the proposed stormwater management facilities and the proposed box culvert.

- Deceleration Lane – Sta. 1492+80 to Sta. 1496+50, Lt. Southbound

The deceleration lane length will be shortened by 370' and will still meet the project design standards. Reducing this length will save overall cost to the project and reduce impervious area without reducing safety to the traveling public.

- Acceleration Lane – Sta. 1506+00 to Sta. 1513+00, Rt. Northbound

The taper on this acceleration lane will be increased by 100'. This will allow the lane to exceed the project design standards while avoiding impacts to the Railroad right of way.

- Acceleration Lane – Sta. 1559+00 to Sta. 1569+00, Rt. Northbound

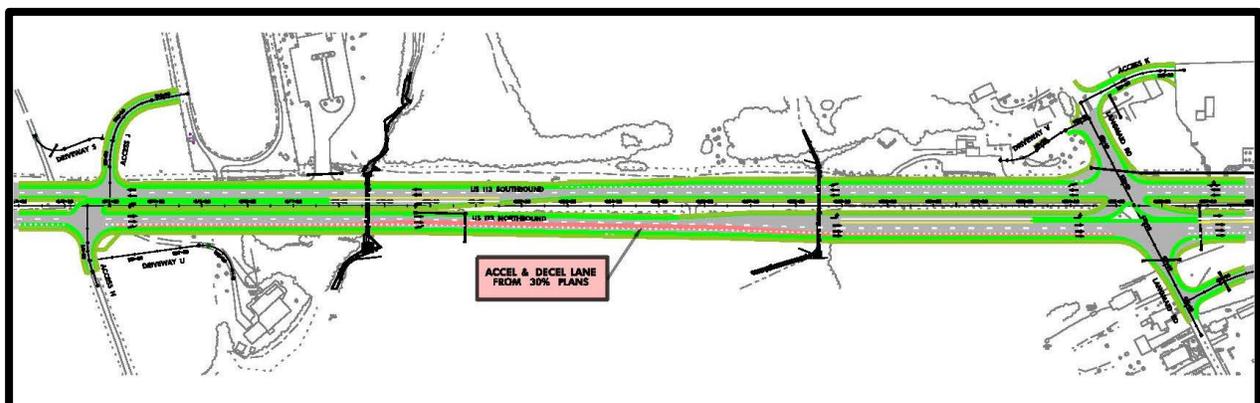
An additional 300' will be added to the length of this acceleration lane, plus an additional 100' to the taper. The additional length will exceed the project design standards while having limited impacts to the project quantities and cost.

- Acceleration Lane – Sta. 1583+00 to Sta. 1594+00, Lt. Southbound

An additional 425' will be added to the acceleration lane length, plus an additional 100' to the taper. The additional length will exceed the project design standards while limiting impacts to the wetlands and stormwater management facilities in the area.

- Acceleration/Deceleration Lane – Sta. 1573+00 to Sta. 1589+00, Rt. Northbound

The lengths of both the acceleration and deceleration lanes do not meet current AASHTO design guidance. Therefore, we are proposing to add an additional 890' to the acceleration/deceleration lanes. This will create a continuous decision lane and eliminate the tapers between the two intersections. There will be minimal impacts to pipe lengths due to this change in lane length, but it will allow the design to exceed the project design standards.



Decision Lane between Access H and Langmaid Road

- Acceleration/Deceleration Lane – Sta. 1596+00 to Northern Project Limits, Lt. Southbound

The lengths of both the acceleration and deceleration lanes do not meet current AASHTO design guidance. Therefore, we are proposing to add an additional 940' to the acceleration/deceleration lanes. This will create a continuous decision lane and eliminate the tapers between the two intersections. This change will allow the project to exceed the design standards.



Northern Tie-In Detail

While we are not able to provide the full desirable AASHTO standards for all auxiliary lanes, due to impacts to existing environmental features, proposed stormwater management features or the need for additional right of way, changes in lengths are proposed where feasible.

We understand that this roadway serves a variety of road users including passenger vehicles, trucks, bicyclists, farm equipment, school buses and other non-traditional vehicles. In order to maximize the operations of the roadway we will run turning templates using AutoTurn for the appropriate vehicles at each entrance, driveway, intersecting roadway, J-turns and other access points. This will help ensure that the intended road user will be able to make the desired movement within the project limits.

The project Team will make sure that access to these entrances are maintained during the construction of the roadway. If access points or driveways need to be closed for short periods of time, this will be communicated and coordinated with the impacted property owners. We feel that this communication is one key to keeping the project running smoothly.

In addition to the modifications to the auxiliary lanes, we are also proposing the addition of pocket lanes and wider shoulders to accommodate bicyclists within the project limits as discussed above. **Our project Team feels that these additional features added to the bicycle amenities will increase the safety for bicyclists and also maximize the operations for the traveling public.** By providing safe accommodations for the bicyclists, all modes of transportation are able to travel smoothly within the project. Bicycle access will also be

considered while this roadway is being constructed. We will ensure that the bicyclists are accommodated where feasible during construction activities.

Construction Sequencing

Our initial approach to the construction phasing will minimize disruptions to the traveling public and the emergency responders while working within the provided restrictions, including coordination with the construction of the railroad crossing including the type of full depth concrete at grade crossing surface and signal systems proposed to be installed. The construction phasing for this project will be broken into six (6) phases. The approximate phases are as follows:

Phase 1: New Construction between Sta. 1430+00 and Sta. 1528+00 Northbound including the box culvert, driveways and access roads on the east side of the roadway.

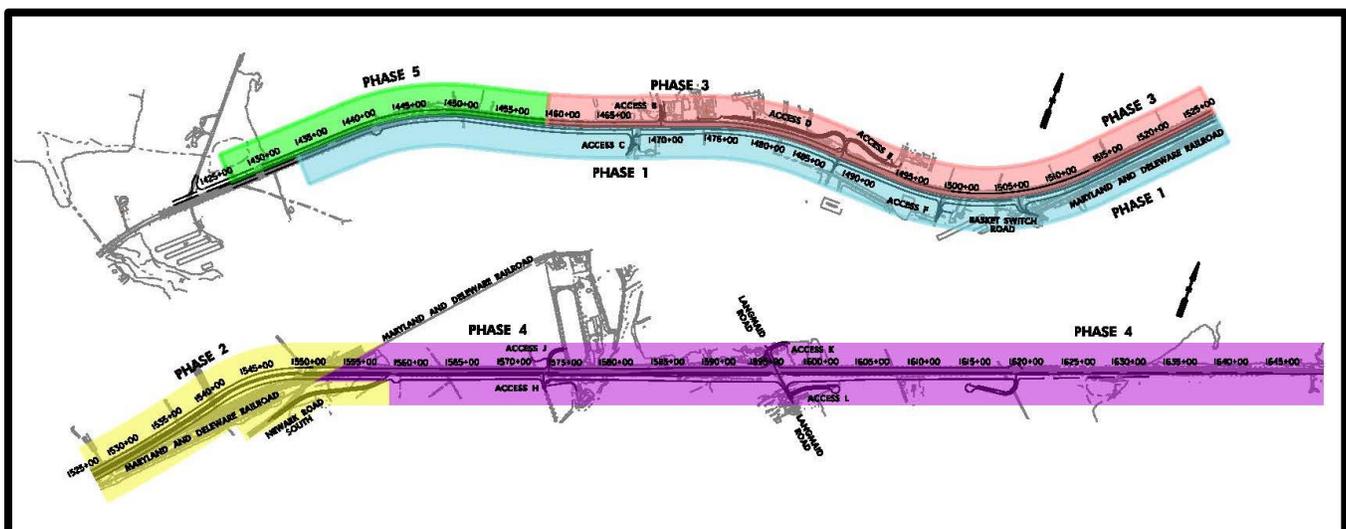
Phase 2: New Construction between Sta. 1528+00 and the Railroad (Sta. 1552+00) both Northbound and Southbound including Newark Road.

Phase 3: New Shoulder Widening Sta. 1448+00 to Sta. 1528+00 Southbound including access roads and driveways.

Phase 4: New Construction Sta. 1552+00 to Sta. 1618+60 Northbound and Southbound including structures, access roads and driveways.

Phase 5: New Construction between Sta. 1430+00 and Sta. 1458+00 Southbound.

Phase 6: Final pavement overlay, striping and tie-ins to existing roadway.



Proposed Construction Phasing

The proposed phasing has been incorporated into our CPM schedule (see Section 3 and Appendix C). We anticipate a start date of **January 5, 2015** and a project completion date of **November 30, 2017** for a total project duration of 1060 calendar days. Our Team will look at ways to potentially accelerate the overall construction duration as the design progresses.

Maintenance Benefits

The G&L/CEI Design/Build Team understands the need to limit the future maintenance on the US 113 corridor. The following items have been identified by our Team to help minimize the future maintenance within the Phase 3 Project Limits:

Landscaping:

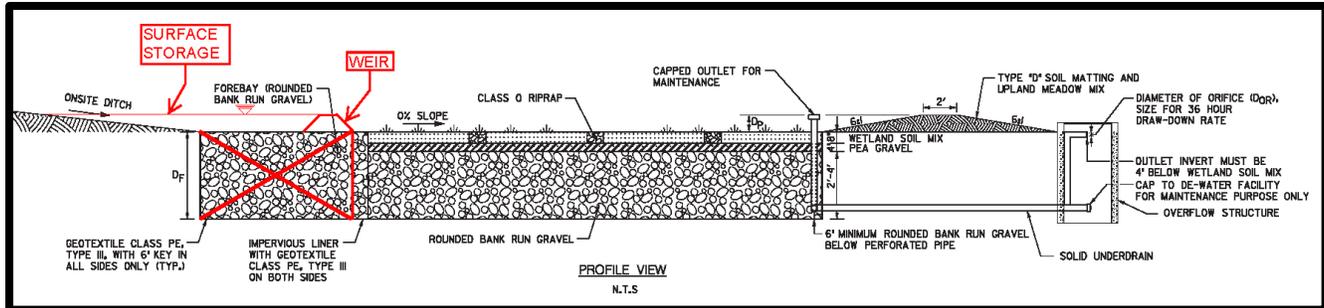
We propose to utilize landscaping species that will require minimal maintenance within the project limits. Our Design/Build Team will review the SHA and MDE standards for landscaping and will choose the right species for this area in order to minimize the maintenance of landscaping. We will work with SHA and utilize “lessons learned” from past US 113 phases and apply them to the project where feasible.

Lighting:

Our Design/Build Team proposes to utilize Light Emitting Diodes (LEDs) for all required roadway lighting within the project limits. The use of the LED lights will help reduce the energy usage, meet Maryland’s 30% energy reduction program and save the State on future operating costs for the roadway lighting. In addition to using the LED lighting, the Design/Build Team will design the lighting cabinets, manholes, hand boxes, etc. to minimize water infiltration and to also minimize the number of standards installed. This will also help to minimize the future maintenance and operating costs on this project while still meeting the appropriate design standards.

Stormwater Management:

Submerged gravel wetlands (SGW) are the main treatment strategy of the stormwater concept. Our Design/Build Team proposes to modify the design of the pretreatment forebays of all submerged gravel wetland facilities to reduce cost and facilitate the ease of maintenance. The 30% conceptual design utilizes a gravel forebay which functions by trapping sediment as runoff flows over gravel prior to entering the media material of the stormwater facility. In order to maintain these facilities, the gravel would need to be replaced periodically as the voids within the gravel accumulate sediment. Our Design/Build Team proposes pretreatment forebays that utilize surface storage and which function by ponding incoming runoff with an earth or stone weir to allow sediment to settle to the bottom of the forebay before runoff enters the stormwater facility media material. This pretreatment method significantly reduces the amount of required gravel, reducing cost and simplifying maintenance. Only the accumulated sediment in the forebays will need to be removed periodically.



Modification of SWM Facility Pretreatment Practice

Other modifications that may be implemented with SHA approval include: use of gravel/aggregate (vs. bank run), geotextile (no impervious liner), alternate dewatering structures or modified observation wells for dewatering.

Value Added to Project Scope

The G&L/CEI Design/Build Team has reviewed the RFP and the 30% plans to determine areas where we feel we can enhance the project scope while balancing the cost of the project. Some of the areas where this is feasible are: geotechnical innovations, equipment management, environmental, safety and Innovations in Design. These areas are discussed below in greater detail.

Geotechnical Innovations

After reviewing the provided soil borings and using our experience with other projects within the same general area, we feel that with some additional geotechnical testing, it may be feasible to leave the existing subsoil in place which will reduce the use of the capping borrow. We propose testing the existing soil and if this soil meets the State's criteria for capping borrow, we will scarify the existing ground, re-compact the ground and eliminate the requirement of importing capping borrow in these areas. The cost of the additional geotechnical work will be minimal in comparison to the savings of leaving the existing material in place. This approach was reviewed and agreed upon with SHA (see Appendix A for one-on-one meeting minutes).

In addition to reducing the capping borrow, we will also look to test the material being excavated from the stormwater management facilities to determine if it meets the criteria for the capping borrow. If the criteria are met, as the borings appear to identify, we will over excavate the facilities to provide the borrow needed within the pavement section. Again, the cost of the geotechnical testing will be minimal in comparison to the cost savings of limiting the amount of material that is required to be brought on-site. Materials excavated within the project limits that do not meet the borrow requirements will be placed into the over-excavated stormwater management facilities to bring them back to grade, eliminating the need (and cost) of hauling this material off site. Since the stormwater management facilities will be lined with geotextile, this will not cause problems with the function of the facilities. This was previously approved per the one-on-one meetings with SHA (see Appendix A for meeting minutes). Reducing the amount of materials hauled to or from the project site also enhances safety of

the traveling public, reduces fuel usage and emissions, and minimizes wear to the existing road network.

Equipment Management

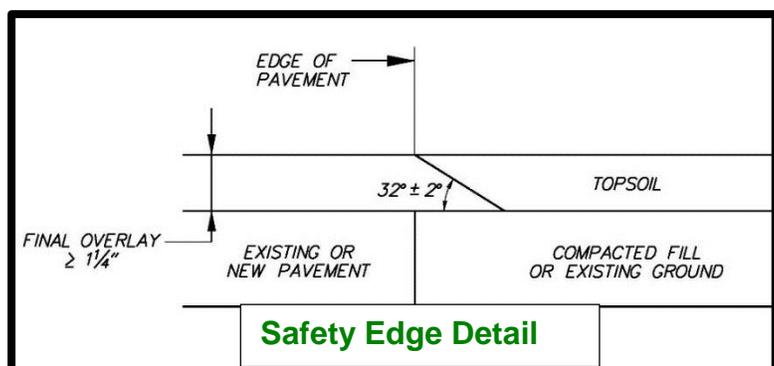
George & Lynch maintains an equipment storage and maintenance facility within 30 minutes of the project site. It is staffed with four mechanics, each with trucks and tools that service construction equipment and vehicles of all types. This will allow G&L to efficiently respond to needs specific to this project as they arise. G&L also owns a permitted borrow pit within 20 miles (Wicomico County) of the project. While not anticipated, this resource is available for import, export, or staging of materials for the project. These resources will help reduce the travel time to the project site and all costs associated with that travel.

Environmental

Another technique that we will utilize on this project will be to install sod within the newly constructed ditches when it is beneficial in stabilizing the area and can accelerate construction. By utilizing sod instead of traditional seed and mulch, we will ensure same day stabilization so that construction activities can progress onto the next stage. This will also essentially eliminate erosion within the ditches and therefore minimize the need to clean out the ditches after storm events. G&L will have a water truck on site so that the sod can be properly maintained. While the initial cost of the sod is greater than the seeding and mulching items, the value will be added in the time saved from cleaning the ditches and the time gained from being able to move into the next construction phase. This also reduces the cost of re-seeding and mulching disturbed areas.

Safety

We propose the addition of a safety element to add value to the project. As part of the FHWA Every Day Counts (EDC) initiative, we propose constructing a safety edge along the two way two lane roadways within the project limits. The addition of the safety edge will help minimize the danger from roadway departures on these roadways. **The use of the safety edge on these two way two lane roadways will help increase the safety of the roadways by minimizing the vertical pavement edge drop off and allow vehicles that depart the roadway to safely re-enter the roadway.** Since US 113 Mainline includes shoulders, rumble strips and guardrail we do not propose utilizing the safety edge on the mainline roadway. Our project Team has successfully constructed several projects with the safety edge feature.



As previously discussed we propose modifying the lengths of the auxiliary lanes. The change in these lanes will add value to the contract without a significant cost to the State.

The changes to the bicycle accommodations, including the pocket lanes and the wider paved shoulder adjacent to the auxiliary lanes to provide the rumble strips in addition to the full width shoulder, will add minimal cost to the State while maximizing the safety for the bicyclists within the project limits.

Innovations in Design

There are several ways that CEI can add value in utilizing different design methods to work with G&L. During the design of the project, earthwork models will be created and provided to G&L by CEI. George & Lynch will be able to integrate these 3D CADD models with the earth moving equipment to utilize machine grade control on this project. Utilizing the machine grade control will minimize the amount of survey required on the project thereby reducing the overall cost of the project and increasing safety for the workers.

The second way we will add value during the design phase is to use the 3D CADD modeling to identify points of utility conflict, areas where the profile can be lowered, and make modifications to the construction phasing. By identifying any additional points of potential utility conflict we can work with the companies to have the facility relocated prior to our planned construction phase in a timely manner and prevent any undue delays to the project schedule. This will also minimize any unforeseen utility conflicts during construction.

By utilizing the 3D model during the design process, we will be able to identify areas where there are no utility conflicts, where the pipes are well below the pavement box, and where additional fill is shown and use this information to potentially lower the profile of the roadway. By lowering the profile we will save on the time required to construct the roadway improvements. This method will also help us to verify that the construction phasing has been maximized to limit the amount of required lane closures and disruptions to the travelling public.

The G&L/CEI Design/Build project Team is committed to provide SHA a high quality project that meets all of the goals set forth. We understand the need to provide a timely response for the emergency responders within the project limits as well as the critical nature of the roadway being an evacuation route for this region of the eastern shore. We will strive, in both design and construction to provide a safe, accessible facility for all road users, from farm equipment to passenger vehicles, from school buses to bicyclists. Our Team understands the need to have the project designed and constructed in a timely manner and will work with SHA to reduce the amount of time required for this project to the greatest extent possible. We will work to design and construct a facility that will minimize the State's maintenance responsibilities in the future; to provide a sustainable project that will not require hands on for many years to come. The G&L/CEI Team will strive to meet all of these goals while providing additional value to the State on this project.

The G&L/CEI Design/Build Team Goals for the Project include:

- ✓ *To provide a safe facility and maintain mobility for all roadway users.*
- ✓ *To provide access control while minimizing delay to roadway users.*
- ✓ *To provide safe access to all roadways for Emergency Response that minimizes the delay for Emergency Response as much as possible.*
- ✓ *To provide a facility that is able to be adequately maintained.*
- ✓ *To construct the dualization at the US 113 and Maryland and Delaware Railroad in the time allotted.*
- ✓ *To Minimize impacts to Forest Interior Dwelling Bird Species (FIDS).*



Project Schedule and Project Management



PROJECT SCHEDULE & PROJECT MANAGEMENT

Project Schedule

The US 113 Design-Build Project (Phase 3) is located in Worcester County, Maryland approximately 3.6 miles south of Berlin. The project study area is approximately 135 acres and extends 3.58 miles along US 113, from North of Massey Branch to Five Mile Branch Road. This project will create a four lane highway as part of the Dualization Expansion from the Delaware State line to the tie-in at US 13 in Pocomoke, Maryland.

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The elements for this project include design submittals, SHA review & approval, utility relocations, construction of new US 113 mainline, access roads, driveways, roadway re-locations, roadway widening, box culvert (structure S-1) construction, drainage improvements, stormwater management (SWM) facilities meeting Best Management Practices, Bio-Retention Swales, lighting at crossovers & road intersections, guardrail (median and shoulders), sodding of ditches for same day stabilization, seeding and matting along road edges, and landscape planting in SWM areas and reforestation to mitigate trees lost from clearing and grubbing.

Our proposed schedule is coded by Phase, Area of Responsibility, Contractor-Subcontractors, and crew codes. This project is to be constructed in six phases as per project plan sequence of construction for each phase:

Phase	Date	Activity Descriptions
1	05Jan2015 - 07Feb2016	Preconstruction Design: 46 activities with 12 milestone activities.
	26Feb2015 - 09Mar2016	Notification/Review: 20 activities.
	30June2015 - 14Jan2016	Utility relocations: 8 activities starting after ROW clearance.
	9Sep2015 - 15Sep2016	65 activities with 3 milestone activities (start & finish {S & F} milestones). Mainline construction NB station 1430+00 to station 1528+00.
2	16Sep2016 - 20Apr2017	35 activities with 5 milestone activities, (2 S & F) milestones, Railroad closure dates 08Sept2016-08Sept2017, and track opening date July 1, 2017. This Phase and Phase 4 will run concurrent in order to coordinate with railroad construction. New Construction NB & SB station 1528+00 to 1552+00 at Railroad Crossing.

Phase	Date	Activity Descriptions
3	20Apr2017 16Jun2017	- 29 activities with 2 milestone (S & F) activities and can run concurrent with Phase 5. SB shoulder widening and access roads station 1448+00 to 1528+00.
4	15Sep2016 07July2017	- 40 activities with 2 milestone (S & F) activities concurrent with Phase 2 for railroad coordination. Mainline construction NB, SB shoulder widening, and driveways at Station 1552+00 (Railroad crossing) to 1618+60.
5	16Jun2017 - 13Oct2017	25 activities with 2 milestone activities (S & F) and can run concurrent with Phase 3. SB new construction Station 1448+00 to 1430+00.
6	30Aug2017 30Nov2017	- 25 activities with 5 milestone activities including S & F, substantial completion, demobilization, project completion. Mainline HMA surface overlay and new construction, final pavement markings, and final project restoration and clean-up.

The Project is coded with the following responsibilities and are linked through project phases by the coding listed below:

Activity	Code
Administration start and finish milestones	A
Box Culvert Structure S-1 and 60" RCP Structure S-2	B
Concrete Islands	C
Drainage pipework	D
Electrical lighting	E
Guardrail	G
Landscaping site stabilization, seeding, mulching and planting	L
HMA pavement and markings	P
Roadwork, initial E&S controls, excavation, GAB, topsoiling, etc.	R
Signage	S
MOT Signage	T
Utilities	U
Work Drawing, SHA Notification and Review	W

Upon award of contract, the final schedule will be updated to include the appropriate coding for the Prime Contractor, Designer, the Design Consultants used for DBE, and subcontractors. G&L is proposing to have the following subcontractors: MOT flaggers; Pavement Markings; Saw Cutting; Clearing-Grubbing; Silt fence-Super Silt fence; Dump Truck Haulers; Rumble Strips; Concrete Islands; Guardrail; Seeding-sodding-matting; Landscape Plantings; Electrical Lighting; and Signage. DBE participation will come from these subcontractors.

George & Lynch will have the following crews available to perform work on this project and will be coded accordingly when final schedule is completed upon award of contract: MOT;

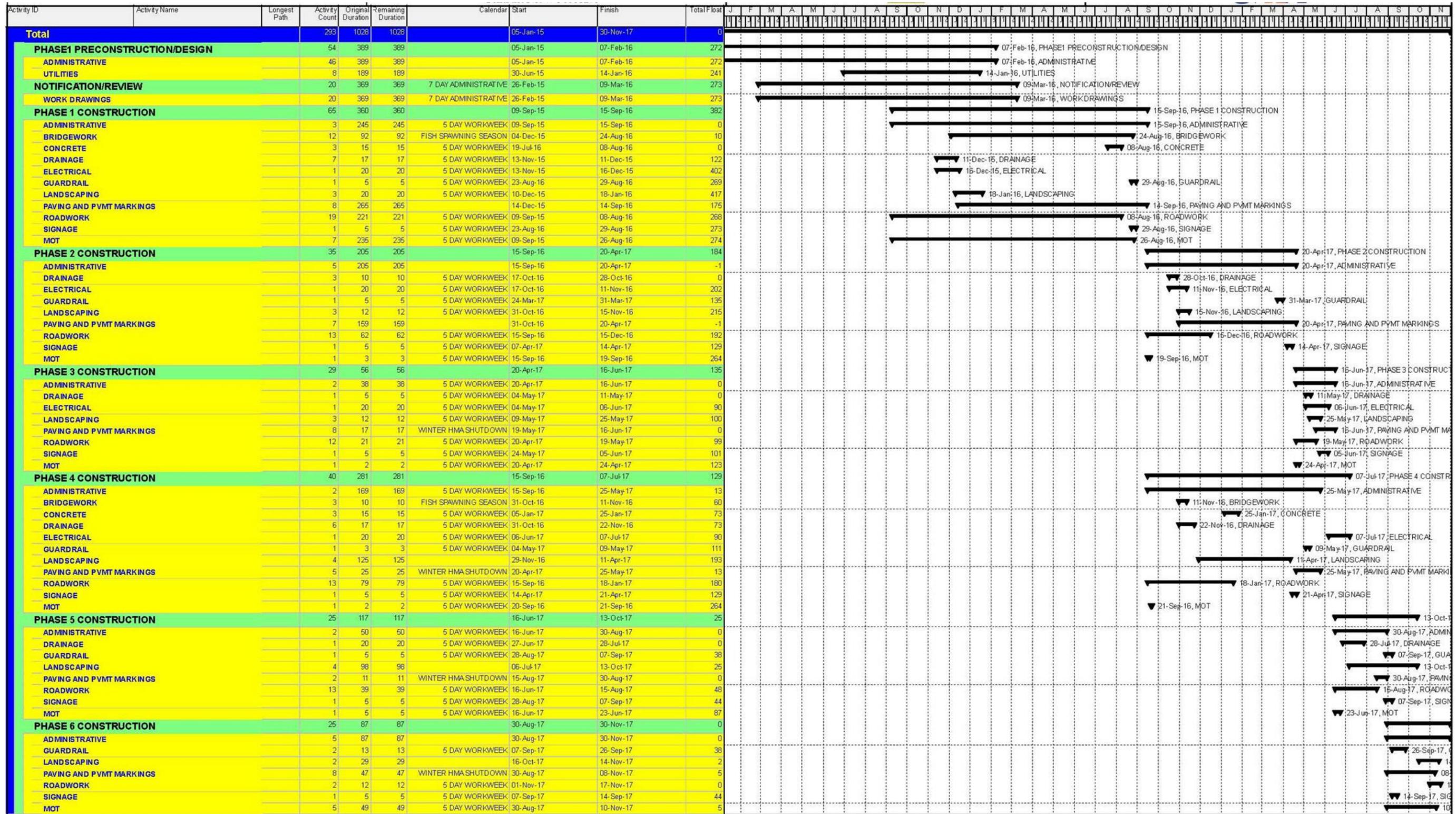
Excavation cut and fill; Excavation fine grading; GAB knock-down; Sheeting; Piling; Structural concrete; milling; and paving.

The proposed schedule uses five calendars: 7 day Administration; 5 day Work; Winter HMA calendar; Fish Spawn Season for work related to Structures S-1 and S-2; and a landscape calendar for planting. All calendars except 7 day Administrative has SHA holidays in RFP with day before and after as non-work days and are based on a 5 day work week. G&L proposes to work four (4) ten (10) hour days using Friday as a make-up weather day. Anticipated start date is **05January2015** and a completion date of **30November2017** using **1060 total calendar days**. Estimated weather days and weekends are incorporated into durations used to build this schedule. The Design/Build Team is allowing approximately 9 months for initial design, review, and MDE approval prior to the start of construction. During this period the Team will coordinate with Utility companies to facilitate relocations to allow construction to start and coordinate with the railroad crossing reconstruction.

This schedule will be updated monthly to reflect real project design and construction activities. Spreadsheet tables will be created to show projected monthly cost analysis, schedule of values, source of supply for SHA lab approval, submittal log showing submittal dates and SHA review time with comments and additional response to comments. A two week schedule will be submitted weekly by field personnel as the project progresses. Monthly status reports will be discussed with SHA field inspectors prior to submitting updates for agreement of actual start and finish dates achieved during the monthly billing period.

The attached CPM schedule (See Appendix C) provides a general overview of the US 113 Phase 3 Design-Build project. Immediately following Notice of Award, our schedule will be expanded into more detail to be used as a working tool to resolve issues and maintain time management of the project. Our constructability Team, consisting of members from both G&L and CEI will meet with the SHA resident inspector to discuss the coordination of all shareholders involved in this project to ensure that all project milestone dates are met. Major shareholders include all utility companies, railroad personnel, emergency responders, local residents, the project designers and the contractors. The Team will follow the 5P approach "*Proper Planning Prevents Poor Performance*" and use this schedule for communication, coordination and planning throughout the design and construction of this project. The overall goal will be to work towards bringing the project to completion ahead of the agreed upon date and within the agreed upon cost.

The following page presents the condensed CPM Project Schedule. A more detailed CPM Schedule is located in Appendix C.



Project Management

Century Engineering, Inc. (CEI) and George & Lynch, Inc. (G&L) have a long history of successfully working together on other contracts throughout the Delmarva Peninsula. These include the recent Design/Build Delaware Motor Vehicle site work, the ongoing Delaware State Route 26 Design/Bid/Build project, runway re-construction at the Dover Air Force Base, and DelDOT's first Design/Build project on Back Creek Road. In addition, CEI has also supplemented G&L's staff with shoring design, surveying, and structural design. **G&L and CEI's focus on process, planning, and scheduling make them an excellent Team for this project.** Both organizations are well integrated into the design-build process. G&L/CEI has qualified personnel experienced in design and construction of major highways. G&L has extensive experience and knowledge on phased highway widening projects under difficult traffic conditions. CEI has the required expertise and experience in highway, civil, H/H, ESC, landscape architecture, traffic, structural, utility and geotechnical engineering for this project. All key design staff are registered PE's and RLA's in the State of Maryland in their respective disciplines.

The participants have personal knowledge of one another and their roles in the project. This will allow us to "hit the ground running" on this contract without the need to build a new relationship. We will work hard to enhance our already positive and professional approach to the work on this project. We would welcome interaction with the various Maryland State and Federal agencies, including the SHA Design group, SHA District 1 construction, FHWA, and MDE throughout the project. We will meet with each group as one of our first items of work is to understand the level of involvement each needs to have in the project, and will then coordinate accordingly. Any ideas that result from these interactions will be incorporated into the Design and Construction phases as appropriate. All Design and Construction will follow SHA standard specifications and the terms of the advertised Design/Build documents for this project unless specifically agreed otherwise by the owner. During the design phase, CEI will utilize personnel having expertise in drainage, stormwater management, roadway design, traffic, CPM scheduling, and constructability as part of the ongoing design. We will have internal discussions daily as our projects move through the design phase. G&L will also provide input on items that may affect the construction schedule, or for specific means and methods of building the work so that these concepts can be incorporated into the design as it progresses, with no need to revisit these issues.

We see the primary advantage of Design/Build vs conventional Design/Bid/Build contracts to be faster delivery of a completed project. Therefore, our Team will work hard to obtain all necessary environmental, design, and other required approvals so that construction may begin even as the Design is still progressing in order for SHA to gain the full benefit of a Design/Build project.

During the construction phase of the contract, CEI's design staff will regularly visit the project site, attend progress meetings, answer questions, and resolve field issues as they arise. **G&L/CEI's working relationship will expedite the RFI process and advance designs to assist in economical procurement of critical key materials and services, all of which enhance construction performance.** This familiarity ensures that the Construction QA/QC Manager is able to quickly

communicate information to the people whose technical experience matches that required by the RFI, often resulting in same day issue resolution. All changes to approved construction documents will be submitted to SHA for approval prior to implementation. RFIs that require changes to the final plans will be directed to SHA for comment prior to issuance of a response.

Project Communication

Communication within G&L/CEI and between the Team, the SHA, and all project shareholders throughout all phases of design and construction is crucial to the project success. All submissions will be made and tracked through the use of ProjectWise and the (Design/Build) D/B Team's Electronic Document Management System (EDMS). The EDMS will be managed by the Construction QA/QC Manager (CQM) to track all project correspondence between G&L and CEI, SHA and other project shareholders. Our communications management activities start with establishing a list of parties involved in the project, including design and construction, and entering contact information into the system. Distribution protocols will be established at the project initiation meeting and maintained throughout the project duration. Coordination with subcontractors and suppliers starts with identifying critical dates and all parties will remain actively informed and involved in the creation and maintenance of the CPM schedule. All transmittals, such as submittals, shop drawings and RFIs will be recorded in the project document management system and will be linked to the project schedule which will track every step of the submittal process, including dates of resubmissions and approvals. By linking the submittal and approval logs with the CPM schedule, G&L is able to quickly generate reports that provide a real time status to communicate the need for approvals and to head off any possible delays in the process.

George & Lynch and CEI's offices are located within 15 minutes of one another by car. This gives us a unique opportunity to interact one on one at a moment's notice. With our offices being located a short distance from Maryland's eastern shore, we are a short drive away from the project site. As the Design is developed, any questions on constructability, equipment choices, construction phasing, etc. that require input from the Contractor and/or the Designer will be discussed by both parties either by phone or at a brief sit-down meeting at either office so that the plans reflect both the desires of the Designer and the Contractor.

Century Engineering will also be internally reviewing the plans for constructability as they have individuals on staff with previous contracting experience on SHA projects and State DOT construction administration experience. By having the Contractor work directly with the Designer, constructability and sequencing issues are put on the table and the design or construction methods can be tailored to those issues. Long lead time materials can be identified and that portion of the design can take priority so construction materials will be on-site when the Contractor is ready to perform the work.

Due to the integration of the Contractor into the design process, there is an opportunity to accelerate construction by releasing elements of design for approval prior to complete plan development. G&L and CEI have previously established a formal program in which G&L's Managers and key subcontractors and suppliers provide written review comments and

recommendations during every stage of design development. CEI develops a specific resolution or action relating to each comment and redistributes this to G&L's Managers in writing for acceptance. Upon acceptance, CEI completes that particular phase of design and submits it to the owner. This process ensures that all design submittals have gone through a thorough constructability review prior to their submission to the owner. We feel this will limit or even eliminate the need to "redo" the plan details as the design progresses, thus improving the overall plan delivery time. More formal plan reviews will be scheduled at intervals agreed upon by, and directly involving, the Design/Build Team, SHA, MDE, FHWA, and other interested parties. Members of the Design/Build Team have previous and very positive direct working relationships with SHA, District 1 personnel and the FHWA representative for the project.

During the design phase of the project, Public Outreach meetings can be scheduled involving community leaders, schools, fire, ambulance, police, local legislators, news media, and others as needed to review the project details and anticipated construction schedule.

After construction begins, on-site partnering meetings will be scheduled at agreed upon intervals by SHA and the Design/Build Team to discuss ongoing construction issues, the construction schedule, participation by Utilities, MD&DE railroad, and others involved in the actual construction of the project. If desired by SHA, separate meetings may be scheduled with the Public and other stakeholders to answer questions and review overall construction progress. If desired by SHA, we have the capability of setting up a dedicated website for the project that could be made available to all interested parties.

Specific means and methods for communicating with important stakeholders on this project are listed below:

The Administration - During the design phases, G&L/CEI and its key subcontractors and suppliers will review the plans to ensure cost effectiveness and constructability. Construction staff will provide formal review comments to CEI from each plan submission, and comments and responses will be tracked through the EDMS as noted above. G&L/CEI will ensure that all submittals are internally reviewed for constructability and compliance with quality metrics before being forwarded to the SHA for approval. G&L/CEI will also provide at least a 14-day notice of pending submissions. Active use of this tracking system by all Team members will ensure that time-critical activities, materials with long lead times, utility coordination and other urgent issues are promptly addressed to avoid potential delays.

The General Public and Community Officials - G&L/CEI recognizes that open communication and the flow of project information to the traveling public, communities, businesses and citizens affected by construction are key to public support for the project. As with all construction projects, this project will cause a temporary change in the local environment, i.e. temporary lane closures, detours, relocated access points, the presence of construction activity and heavy equipment, etc. Citizens and businesses are much more receptive and understanding of these changes when they are informed of what is going to happen before it happens. There is always inherent conflict between the interests of efficient roadway

construction and the interests of the traveling public so the success of the public awareness/outreach program will hinge greatly upon the proper and timely dissemination of information about the construction schedule and its impacts. G&L will inform commuters of upcoming traffic pattern changes or closures by the use of variable message signs posted on affected roadways during the week prior to any change. G&L/CEI will take several proactive steps including designating a Public Relations Officer and developing a program for public contact and community relations in a written plan to ensure that the public has access to information and is informed of any significant change to their environment before it happens. **The G&L Team is fully committed to involving all project stakeholders in the design and construction phases of the project.**

Response to Inquiries and Comments - Any questions or comments that are received from residents, businesses, or other members of the public will be referred to the SHA's Public Outreach Manager within four hours. A Request Form will be completed for each question or comment. We will assist in preparing responses to inquiries as needed. Once an inquiry has been responded to, the Request Form will be updated. Completed Request Forms will be e-mailed to the SHA's Public Outreach Manager monthly.

Other Stakeholders including Environmental Agencies – G&L/CEI experience with the Design/Build process has shown that early and continuous environmental agency coordination is a key component to ensuring that a project remains on schedule, budget, and in compliance with the permits. Therefore, our approach is to coordinate closely with the SHA's EPD and Landscape Operations Division throughout the project. This coordination will include at least one pre-construction meeting among SHA, MDE, permitting agencies and G&L/CEI, including the G&L environmental monitor. Regular meetings will be held between these parties; so timely responses to any questions and inquiries can be obtained. The coordination will involve the review of ESC, and the SWM Reports, and include updated forest impact plates.

Emergencies – Knowing that US 113 is part of an evacuation route system, our Team will develop an emergency response plan to be approved by SHA prior to the start of construction.

Utility Companies – We understand that there are multiple utility companies within the project limits and plan on opening the lines of communications with them early in the design process.

When the project is ready to open, we would suggest a "Ribbon Cutting" ceremony to recognize those responsible for delivering a successful project to the citizens of Maryland!

Coordination Management

Upon notice of award of the Design/Build contract, communication will begin with the owners of the overhead utilities throughout the project limits to finalize the design and develop a schedule

of their required relocations. The SHA District 1 Utility coordinator and District 1 Construction personnel will be part of these discussions. We feel a key element of the project is getting the Utility relocations underway during the design phase of the contract so that actual field construction is not delayed. Confirmation of required Right of Way acquisitions will be verified prior to any Utility relocations. Also, any environmental permitting must be acquired before Utility work could begin in affected areas on the project. The contractor's schedule will be flexible and adjusted to reflect the timeframes required for the overhead Utility relocations, with the goal being to work in the same sequence as the Utilities wherever possible. Any underground services to residences along the project corridor will be adjusted as part of the road construction activities.

Scheduling of the railroad crossing replacement by MD&DE will be considered as part of the necessary Utility relocations. CEI is currently working with DeIDOT to inventory, design, and inspect numerous Railroad Crossings throughout the State of Delaware and have previously designed railroad crossing surface and signal reconstructions at over 30 locations throughout Delaware, including crossings on track operated by the MD&DE railroad. This experience gives us excellent insight into railroad crossing construction methods, and will help us in our coordination efforts with the MD&DE Railroad crossing construction. Depending on the construction methods required by the Railroad contractor, we have considered options for detouring traffic around the crossing, using Newark Road South, while it is being replaced (if it cannot be constructed in halves) or shifting traffic in two phases (if the crossing can be constructed in halves).

It should also be noted that Approval from Maryland Department of the Environment (MDE) will be a critical component in the plan approval process to allow construction to begin. A schedule for review and approval of plans will be a critical element to the Design/Build Team and will be incorporated into the project delivery schedule.

Risk Management

The Design/Build Team feels the best way to minimize and mitigate the risks on the project is to identify as many potential issues as possible, and consider them in the bid when it is prepared. Our desire is to not burden SHA with any issues that should have been recognized by our Team prior to submission of bids. Secondly, G&L and CEI will work closely together during the plan development stage to jointly consider constructability as part of our process. We will establish formal procedures for submittal reviews and distribution of documents. This would include material sources, shop drawings, and requests for information (RFI's). Quick turnaround of these documents can help mitigate the associated risks. Ongoing communication with all stakeholders on the project will eliminate any surprises to the public and the associated negative reactions that could otherwise delay construction. Communication and coordination with those entities not under direct control of the Design/Build Team is also essential. Failure of these entities to perform their functions (Utilities, MD&DE Railroad, Environmental Permitting, R/W acquisition) can result in unacceptable delays to the contract. We will work very hard to establish positive working relationships with all outside parties as early as possible upon award of the

contract. Coordination of our Subcontractors, both on the Designer's and Contractor's side, will be needed to deliver the project on time. Those are risks that are clearly the responsibility of the Design/Build Team. We understand these issues and will manage all subcontractors and work accordingly.

Quality Control

Management tools we would use include the establishment of a project specific "Sharepoint" site where various documents can be viewed by all parties involved. This would include plans, specifications, shop drawings, RFI's, change orders, correspondence, or any other items desired by SHA. The site would be started in the Design phase and carried through construction. Different individual levels of "privilege" can be set regarding the ability to review and/or edit the documents. CEI has successfully utilized this system on other projects with G&L. This also allows us to easily provide SHA with digital contract files including shop drawings, all RFI's, Design and/or Construction correspondence on a disc or flash drive at the conclusion of the project. We especially like the use of "Microsoft Access" which allows us to log and import documents into one singular file. The project Team will provide SHA with construction photographs on a monthly basis, or as needed. It will be important to document the construction process not only from a public perspective (website and outreach materials), but also from an industry perspective.

Electronic grade control will be utilized. The type and content of the digital design files will be discussed internally by the Design/Build Team so that the files will be available in an acceptable format for use immediately upon receiving design approval.

Another advantage of our Team is the use of a dedicated survey party that is employed by Century Engineering. Communication on site with our surveyors on a daily basis will greatly assist in resolving field construction questions/problems as fast as possible in order to keep the construction crews continuously active on the job.

We will be willing partners in the formal "Partnering Sessions", but really believe that we follow the principals of partnering (mutual respect, truthfulness in negotiations, professionalism, and quality work) as part of our standard way of doing business with all of our clients every day, even if a formal agreement has not been executed.

Schedule Management

G&L/CEI will utilize its extensive experience in construction scheduling to successfully manage the design and approval process. A phased construction sequence will ensure a timely and coordinated project start and successful completion within the time allotted. Because G&L Project Superintendents participate in schedule development, ownership of the schedule is built in from the start. The schedule's CPM logic diagram is posted at all times on the wall in the G&L field office and the field conference trailer. It is a functional tool for effective job management. The G&L/CEI organizational structure ensures that schedule issues are identified and resolved

quickly, while maintaining continuous communication within the Team and external stakeholders. G&L/CEI will use a variety of project management software programs such as ProjectWise, Primavera, Microsoft Access, and SharePoint to help manage and control the project. Access to this information will be available 24/7. We strongly believe that our Team structure and proven management approach, supplemented with our use of latest technology, will effectively draw upon the strengths of both our designers and construction staff. All of these elements have been proven successful on G&L/CEI projects in the past, and will be used as the groundwork on this project.

The CPM Schedule will be constantly reviewed and updated by the Design/Build Team, from the original submission through the end of the project. Both Design and Construction activities will be entered and updated on a monthly basis at a minimum. The baseline schedule and all subsequent updates will be submitted for review and approval by SHA. Update meetings including interested SHA participants will be held, either as part of overall job progress meetings, or independently to address only the schedule if necessary. We understand that the schedule is a constantly evolving document that requires attention on a regular basis. We will use the schedule as a tool to manage the job, not just a document to be submitted and not utilized. Any owner authorized changes that may affect the critical path will be identified as soon as possible in order to negotiate an equitable time extension, if warranted. We will not wait until the end of the project and surprise the Owner with requests for time and/or dollars. Any requests that the Team believes to be legitimate will be brought forward as soon as the issue is discovered in order to mutually work on mitigating such contract changes. The CPM will be an important tool in determining any owner caused time extensions due to extra work and/or changed conditions. Issues that are the responsibility of the Design/Build Team will also be clearly documented in the schedule with the understanding that the Team will be held accountable for those issues. Our scheduler is a direct member of the Design/Build Team (not a subconsultant) and will be working on the project on a daily basis. He will be in close contact with Design and Contractor personnel to assure that the schedule is accurately reflecting the actual job progress to date. Should the project fall behind schedule, then extended working hours (and/or night work), re-sequencing of activities, or mobilizing additional resources in multiple work areas will be evaluated and implemented as determined by the Design/Build Team until the project is back on schedule.

Change Order Management

We believe that the primary key to successfully managing contract changes is open, honest, and prompt notification to SHA by the Design/Build Team that a change has occurred. This allows SHA and the Design/Build Team the most time to develop mitigation strategies in order to address the change. For a Design/Build project, it is critical to determine as soon as possible if the change is the responsibility of the Owner or the Design/Build Team. The CPM schedule will be used to determine any impact to the critical path of the project. The change will be input into the current schedule at the time the change was introduced. Should additional time or cost be warranted, the Design/Build Team will make personnel available to negotiate the impacts at the earliest possible time. If the change is the responsibility of the Design/Build Team, then we will internally discuss the best strategy to mitigate the change and share that information with the owner, at no additional cost to SHA. All changes and supporting documents can be uploaded

to the Sharepoint site for review by the appropriate parties. Should revised plan sheets be necessary, they will be provided by CEI. A job specific procedure, agreed upon with SHA District I will be established to clarify plan distribution and protocols. Clear direction will be provided in the procedure so that the Design/Build Team and District I know when construction may proceed on any plan revision. Any agreed additional compensation will be added to the “Monthly Projected Cost Estimate” spreadsheet for payment purposes. Time extensions would be formally approved via correspondence from District 1 Construction.

Project scope must be strictly controlled to ensure that the project is completed on time and within the allotted cost. All proposed changes in project scope will immediately be referred to the Design/Build Project Manager (DBPM) to make a preliminary assessment of whether such changes warrant further evaluation and verify acceptance of cost-responsibility. If appropriate, the DBPM will initiate development of a change order request to secure final authorizations from the Quality Managers and SHA. The DBPM will also secure the SHA authorization if such changes warrant exceptions to project requirements or if the SHA will incur any cost responsibility. All change order requests will include the following information: the need for the change; alternative solutions; benefits of the change; effect on project requirements; effect on other work packages for each alternative; schedule impact for each alternative; the cost impact for each alternative; and cost responsibility. When scope changes are authorized, the DBPM will ensure the immediate adjustment of project baselines for cost and schedule.

G&L/CEI has the experience to avoid many of the typical changes that occur during the construction process. Issues are resolved during the design process as our Team of designers and contractors are all actively reviewing and incorporating better, more economical ways of designing and constructing the project. The real benefit comes when field conditions are not as they appeared on the plans and a field change is required. Our past relationship and strong Team structure allow us to address problems as they arise, and a resolution can usually occur that very same day.

Safety Management

The Design/Build Team will work diligently to maintain a safe work environment on the project. G&L/CEI considers safety a major component of a successful project. G&L employs a safety officer dedicated only to safety management and has won multiple annual awards for safety through the Delaware Contractors Association. Hardhats, vests, safety glasses and safety shoes are mandatory on all George & Lynch projects. Any work site incidents will be documented and follow-up will be done as needed to prevent similar occurrences in the future. Safety of the traveling public, bicyclists, and pedestrians are equally important to the overall work zone safety plan.

G&L believes that all employees have a voice. We conduct two daily meetings with each crew, one before we start work, and one after we finish for the day. All employees are encouraged to openly address safety concerns during those meetings.

Also, every employee and stakeholder within the project has the right to stop work if there is a safety issue. A project is not a success unless the goal of zero accidents is achieved; it will be

the policy of G&L/CEI to perform all work in the safest manner possible consistent with good construction practices. In support of our relentless focus on safety, we have included G&L's industry-excellent 3-year safety history table, which includes data of over 1.5 million man-hours.

G&L believes that providing industry-excellent safety training to our employees will achieve the goal of full safety for every person on G&L's projects. Training courses include: two-day safety orientation program; OSHA-30 hour; Traffic control and supervisor course; flagging; confined space; heavy equipment operator training; and principals of blasting. All employees and subcontractors are drug and alcohol tested prior to working for G&L. G&L conducts random testing and "for cause" testing when required. All subcontractors are required to comply with the safety policies and procedures established by G&L prior to the start of the work. G&L's site specific plan for safety/health management will include the following: motorist safety; pedestrian and bicyclist safety; utility safety; railroad safety; work area access control; incident management; and reporting.

YEAR	2011	2012	2013
TOTAL HOURS WORKED	498,203	512,110	547,184
NUMBER OF:			
Total Recordable Cases	6	10	5
Lost Workday Cases	1	0	0
Days of Lost Time	20	0	0
Restricted Day Case	4	5	2
Restricted Days	89	42	15
OSHA INCIDENT RATES:			
Lost Workday Rate	0.4	0.0	0.0
Recordable rate	2.41	3.91	1.83
EMR	0.420	0.346	0.453

G&L conducts random testing and "for cause" testing when required. All subcontractors are required to comply with the safety policies and procedures established by G&L prior to the start of the work. G&L's site specific plan for safety/health management will include the following: motorist safety; pedestrian and bicyclist safety; utility safety; railroad safety; work area access control; incident management; and reporting.

Motorist Safety - Motorist safety begins with a well-designed Traffic Control Plan (TCP) that will address potential traffic safety concerns in and around long-term work zones, temporary lane closures and detours. G&L/CEI will design the TCP to be in accordance with the MdMUTCD. G&L understands that even the best TCP concepts do not always work effectively on the road, so during traffic control placement the Traffic Control Manager (TCM) will study the traffic control set-up from the perspective of an unsuspecting motorist. G&L will review the TCP set up after implementing each stage to make additional improvements. The TCM will also make routine inspections of the project on weekends/holidays to ensure that all devices are in proper service and to observe traffic flow for possible problems.

Pedestrian and Bicyclist Safety – All road users are important to our Team. During construction we will maintain bicycle and pedestrian traffic along with vehicular traffic. We will utilize flaggers, message boards and signs as needed to ensure that traffic is maintained in the safest manner possible.

Utility Safety – G&L operates a systematic, company-wide Miss Utility program that ensures proper procedures are followed for every excavation. G&L owns and operates electronic location devices and a vacuum excavation machine that are operated by trained in-house personnel. These assets enable G&L crews to find and locate existing underground infrastructure without risk of damage to the utilities and with minimal excavation and interruption to US 113 and side roads.

MD&DE Railroad Safety - Although direct impacts to MD&DE Railroad facilities are required for this project, G&L will be proactive as we have in the past in working safely near these Railroad facilities. G&L will obtain the necessary Railroad Protective Liability Insurance for the project. The entire Design Build Team will communicate with MD&DE Railroad early and often prior to performing any work near the facilities and will incorporate the requirements of the MD&DE Railroad contractors into our construction sequencing and overall phasing.

Work Area Access Control - G&L will control access to the work areas at all times through the use of warning signs. All personnel on the jobsite will be required to wear hardhats, steel toed shoes, safety vests, safety glasses and hearing protection for specific work activities. Visitors to the site will be directed to the field office where safety equipment will be issued.

Incident Management and Reporting - In the event of an accident or emergency within the work zone or project site, the Project Superintendent will immediately assess the situation and take action appropriate to the nature of the emergency. In the event of personal injury or fire, the 911 Emergency Center will be informed of the situation while first aid or fire suppression is conducted by our trained site workers.

Message Boards will be utilized to provide advance notice of construction and changes to traffic patterns throughout the life of the job. Warning signs will be installed as required by the MdMUTCD on mainline US 113 and all abutting side roads.

Visitors to the construction site will be welcome, but only through scheduled visits. Job tours will be accommodated if desired and safety equipment will be provided for those that do not have their own gear. All visitors must be accompanied on site by a member of the Design/Build Team and/or SHA personnel.

The key component to the success of this project will be the ability of the G&L/CEI Design/Build Team, working closely with SHA, to bring together all of the various individuals and stakeholders to form a cooperative team. The team must stay focused with the primary objective being to deliver a quality project to the citizens of Maryland in a timely and cost effective manner. To do so will require dedicated efforts by a number of key individuals in order to gain consensus of competing interests and coordinate the needed approvals so that Design and Construction can move forward in accordance with the approved overall project schedule.

G&L/CEI staff has the experience and expertise to do just that and have demonstrated their ability to do so on many similar type projects involving Environmental permitting, Utility relocation, Emergency Responders, Public Interest groups, State and Federal agencies, and all others showing interest in the project. Our people are well versed in the various phases of the project from initial scoping all the way through final construction.

We have detailed our approach to project management in the Technical Proposal, and look forward to working with SHA on this important project.



Environmental Approach

Environmental Approach



ENVIRONMENTAL APPROACH

Environmental Features

The Design/Build Team (Team) understands that the US 113 project traverses areas that contain sensitive resources. We understand the Administration’s intent to protect these resources and therefore propose innovative approaches to avoid and/or minimize impacts to these resources to the greatest extent practical. Innovative designs and construction methods that we have developed from experience on similar projects and will implement to reduce environmental impacts are described in the Practices and Innovations section.

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Wetlands and Waterways – As detailed in the Environmental Re-evaluation dated June 2014 as well as the MDE Nontidal Wetlands and Waterways Permit (14-NT-2027/201460434), the Team understands that up to 0.641 acres of permanent wetland impacts are anticipated based on the concept design. In addition, several waters of the U.S. (WUS) will accrue permanent impacts totaling approximately 1,678 linear feet. All in-stream work will be conducted in compliance with Maryland mandated stream closure periods for Use I (March 1 through June 15, inclusive of any year) and Use II (as detailed in Nontidal Wetlands and Waterways Permit) streams. Our Team intends to reduce the impacts to the MDE/ACOE regulated wetlands and WUS on this project to the greatest extent practical. Our refinements to the concept design will achieve this goal by reducing the limits of disturbance (LOD) through adjustments to grading and detailed phasing to minimize stockpiling and ensure construction work in stream areas is in compliance with seasonal restrictions.

Forest Resources - The Team understands that approximately 13.39 acres of forest will be cleared to construct the project if the current concept is utilized. As part of our overall approach to environmental conservation we will minimize impacts to forested areas through reductions in the LOD. Root pruning and low retaining walls at select significant trees may also be considered. In addition, the Team understands that habitat for Forest Interior Dwelling Species (FIDS) is present within the project corridor. To protect this habitat, the Team will limit construction within the forest interior; limit disturbance of forest habitat during the breeding season for most FIDS; maintain as much forest habitat as possible; and preserve canopy closure where possible.

Rare, Threatened and Endangered (RTE) Species – Based on the Project’s special provisions, the Team understands that no federally listed rare, threatened, or endangered species are anticipated to be directly impacted by the project. Although no federally listed RTE species are expected to be encountered within the project area, the Team understands that four state listed species may potentially occur within this section of the project, specifically near wetland W-12. Based on this potential, the Team will adhere to environmentally sound construction practices to limit potential impacts to these resources.

Procedure and Practice Implementation – Our Team is committed to addressing and

implementing environmental stewardship measures for this project. Our Environmental Compliance Manager (ECM) will be involved through design and construction to coordinate and ensure that: measures are taken to reduce impacts where practical, valuable environmental resources are protected, and permit compliance is addressed and documented. Close coordination between the design team, ECM, the construction team, ESC Manager, and the QA/QC Manager, as well as SHA personnel will be emphasized to protect the environmental resources associated with the project.

Permit Acquisitions

The Team recognizes the environmentally sensitive approach and philosophy of environmental stewardship that SHA desires and has applied during development of the US 113 Phase III concept design. Our team is committed to partnering with the SHA and continuing this approach to provide high quality environmental compliance and performance. Our Team will implement a proactive and coordinated approach through design and construction to partner with SHA, permitting agencies, and other stakeholders to exceed project goals and promote good communication. The Team understands that any changes to the existing concept may require modifications to the existing Nontidal Wetlands and Waterways permitting documents and Maryland Department of Natural Resources (MD DNR) Reforestation permit. Our Team will stress the avoidance or minimization of resource impacts to the maximum extent practical and fully anticipates reducing impacts to environmental features project-wide.

Throughout the design-build process, the Team will coordinate environmental permitting correspondence, applications, construction plans, and technical submissions through the SHA. A pre-permitting meeting will be held to coordinate additional necessary submissions to various agencies, discuss the SWM, ESC, phasing, alternative concepts/ designs, the schedule for permitting, and the content of the submissions. Submissions and construction plans will reflect input and review comments received by SHA, MDE, and any local and federal review agencies. Any proposed changes to wetland and waterway impacts will be coordinated through the SHA-Environmental Programs Division and based on this coordination, the Team will modify necessary permitting documents for SHA's submittal to MDE/ACOE as applicable. Following a similar approach, any changes to the LOD, or discovery of previously unidentified archeological resources will require coordination with the SHA-Project Planning Division. If unidentified archeological resources are unearthed, the Team will adjust its construction activities as necessary within the area of discovery and await further direction from SHA. Any proposed changes to the forest resources impacts will be coordinated directly with EPD, SHA-Landscape Architecture Division and the SHA Landscape Operations Division prior to advancing the design or construction phases. As applicable, the Team will modify the Reforestation Permit and develop supporting documentation for SHA's submittal to the MD DNR. If issues related to natural or cultural resources arise during ongoing environmental reviews, the Team will immediately coordinate with the appropriate SHA Division and IEM, and provide supporting documentation to adhere to permitting and regulatory requirements included in the Contract's Environmental Performance Specification.

To meet the design-build schedule the Team will submit sections of the project as separate "rolling" submissions to review agencies to expedite approvals. Notification of submission to SHA will be given 14 days in advance. To ensure adherence to the schedule, submission

requirements will be communicated in advance. Once approval for a segment or phase of construction is obtained from MDE and SHA, clearing and grading will begin on the phases that have been approved. The Team will not proceed with a phase of construction until all relevant plans have been approved, permits obtained, and SHA issues approval. The ECM will work with SHA, MD DNR, MDE, and other regulatory agencies as needed to ensure permit requirements can be implemented and all permit modifications are addressed properly through design, construction, and project close-out.

Submittals for new/extended culverts and realignment of approach channels (if needed) will be coordinated with appropriate SHA divisions. This will include preparation of construction plans, computations, and permit requirements or modifications including applications and supporting impact plates for permits (Federal/State Joint permit, General Waterway Construction permit, Water Quality Certification). The design will follow the standard SHA design requirements and submittals that we have utilized on other SHA projects. Drainage features will be integrated with SWM and ESC designs and developed in accordance with the SHA “Highway Drainage Manual” and all other relevant updates and guidelines. All computations will follow current SHA requirements and will be thoroughly documented in reports.

The Team will develop SWM plans/ reports that exceed the design criteria in accordance with the Design-Build bid documents and special provisions, the MDE 2000 SWM Design Manual including Supplement No. 1 for ESD to the MEP, SHA Site Development Guidelines, and relevant SWM Guidelines from MDE and SHA. SWM design will be finalized by the Team based on the SWM concept design provided and as described in the LOI issued by MDE. Modifications to the concept will be designed to reduce impacts to resources and to provide additional water quality benefits. The Team will coordinate with SHA and MDE to document ESD design requirements and criteria at a pre-permitting meeting. The Team will address investigation of outfall locations including discharges from proposed ESD/ SWM facilities and concentrated flows leaving the SHA right-of-way to document conditions and assess stability. Analysis of downstream flows will be performed and outfalls needing improvement will be addressed in accordance with SHA criteria and project right of way. The Team will develop SWM designs and submit to MDE (through SHA-HHD) for review. SWM reports will follow SHA and MDE standards and will include all necessary discussion, forms, and computations. Possible waivers and variances for quality/ quantity control will be coordinated with SHA. SWM designs will consider function, site conditions, treatment required, integrated design with ESC and traffic control, impacts, SHA Site Development guidelines, access, ease and cost of long-term maintenance. Non-exempt facilities will be designed in accordance with MD 378. A planting plan will be prepared for each facility with consideration of: visual quality, maintenance, species selection, water zones, installation specifications, soil amendments, and control of invasive species. A facility maintenance and inspection schedule will be included. During construction, inspection and as-built certification will be performed including photographs, material testing data, plant and turf establishment checklists, as-built surveys and checklists, and computations as required. Design and as-built information will be provided to facilitate inclusion in the NPDES inspection program.

Erosion and Sediment Control Plan

The Team will develop ESC plans that exceed the design criteria in accordance with the

Design/Build bid documents and special provisions, MDE ESC Standards and Specifications and relevant ESC Guidelines from MDE and SHA. The Team's approach to this project will emphasize protecting environmental features including streams, wetlands, buffers, and forest areas. Following the pre-permitting meeting the ESC plans will be developed, integrated with SWM design, and encompass all phases of construction coordinated with Traffic Control and earth work. The phasing and sequence of construction, including grading, staging, stockpiling, topsoil, and temporary/permanent stabilization, will be coordinated to reduce soil exposure area and duration. ESC phasing and drainage design will be coordinated so that drainage is maintained and controls are effective during interim conditions. The Team will submit (to MDE through SHA) an ESC Schedule at least 14 days prior to earth disturbance activities. The schedule will address items such as demarcation of sensitive environmental areas, perimeter controls, the work to be performed, and removal of controls.

The ESC plans will include a designated LOD, right-of-way, contours, general notes, controls, utilities, and all natural resources and floodplains. Stabilized construction entrances will be specified at appropriate locations for the project. Measures such as dikes and swales will be specified to divert clear water runoff around disturbed areas, and to convey sediment laden runoff from disturbed areas to sediment trapping measures. These devices will be located outside of waters of the US (WUS) and wetlands. Super silt fence will be used along streams and wetlands as redundant ESC. All measures will be contained within the designated right-of-way. ESC plans will be reviewed by the Team's MDE certified MD P.E. ESC plans will be submitted to MDE (through SHA) for review and approval. Clearing and grading will not commence until approval is obtained from SHA and agencies. Requirements of the Nutrient Management Plan and vegetative stabilization will be addressed through project completion. ESC controls will only be removed after areas are stabilized and with approval of MDE. ESC Permit certification letters will be completed for the project. The ESC design will include in-stream measures at culvert improvements and may include: culvert diversion, pump around practice, sand bag diversion, or fabric stream diversion. Possible channel improvements will be addressed with time of year restrictions coordinated in the schedule. We will notify SHA 48 hours in advance of in-stream construction and address measures to minimize potential fish mortality, adhere to all applicable water quality standards, and monitor stream turbidity, if necessary.

ESC controls will be inspected and maintained on a regular basis including after rainfall events. Temporary or permanent stabilization will be integrated with grading operations to reduce soil exposure. The ESCM and ESC compliance team will have authority to direct operations and will have support from ESC trained (Green/Yellow card) crews to address ESC QA Rating items and other needs from daily inspection logs. Upcoming operations and sequence of construction will be reviewed daily, and ESC related work shall be scheduled with appropriate crews, materials, and equipment. Prior to large storm events, the Team will inspect and prepare ESC measures, (e.g. pump out or clean out). Following a storm event, inspections of all perimeter controls will be made and corrective action (if any) will be recommended and implemented for ESC Rating compliance. The ESCM will regularly communicate with SHA's Construction Inspector, the SHA Q/A Inspector, the MDE Inspector, the IEM, and other agencies and stakeholders. The ESCM will ensure that the ESC controls are functioning and in compliance with permits at all times. Modifications to ESC controls or sequence may be identified by the IEM, the ECM, the ESCM or other team member. Minor field adjustments may be documented, approved, and implemented in the field. Following the SHA/MDE MOU some modifications can be approved in

the field - other adjustments require approval of MDE based on permit conditions or approval of others may be necessary. These revisions/ approvals will be coordinated with all members of the ESC team. Modifications will be documented using appropriate ESC Request for Revision forms. The Team will dedicate a minimum of one crew to service erosion and sediment controls as directed by the ESCM.

Cultural Resources

Based on SHA's correspondence with the Maryland Historic Trust (MHT); no historic properties will be affected by the implementation of Phase 3. Further, the Team understands that the area between Five Mile Branch and Massey Branch has low archeological potential based on the lack of level, well drained terrain overlooking surface waters. Although no cultural resource impacts are expected based on MHT coordination and previous investigations, the Team will develop a commitment tracking database to ensure compliance with all approvals and laws relating to cultural/environmental resources. The database will include all permit conditions as well as pertinent information contained in the Special Provisions, including the Environmental Performance Specification. Information generated from this database along with field verifications will be utilized to develop a quarterly Compliance Report that will track and confirm compliance with each commitment pertaining to the project. Updated impacts to wetlands/waterways, forests, and other resources will be included in tabular format and be compared to authorized impacts for specific resource locations. Note that if previously unidentified archeological resources are identified, our team will coordinate with the SHA-Project Planning Division. If unidentified archeological resources are unearthed, the Team will adjust its construction activities as necessary within the area of discovery and await further direction from SHA.

In addition to the tracking database, the Team will develop an Environmental Compliance Team (ECT) that will be staffed by the following individuals: the ECM, FECM, the ESCM and the CPM. Coordination by our ECT will be done through the SHA IEM, if required, and the MDE inspector. Our team will invite the IEM to participate in our weekly Environmental Compliance meetings. The team will establish an Environmental Compliance Implementation Plan. This Plan includes the following core values: 1) meeting with designers and attend project meetings to address any concerns or questions before submittals are made; 2) ensuring permit conditions are strictly obeyed during design; 3) monitoring compliance with project-wide environmental commitments; 4) evaluating the project during design and construction to explore additional avoidance and minimization measures; and 5) evaluate other environmental stewardship opportunities and enhancements within the project limits. During design phases the ECT will: participate in weekly design meetings and over-the-shoulder reviews to monitor adherence to project commitments and look for further opportunities to avoid and minimize impacts; provide official compliance reviews on design submittals as part of the Quality Assurance plan in which designs are checked against permit requirements and project commitments; and submit the necessary documentation for permit modifications/ approvals at design milestones and quarterly reviews. The Plan will be updated weekly and submitted, as required, to SHA on a quarterly basis.

A Pre-Construction Conference attended by the Team, SHA, the MDE inspector, and the IEM will allow for discussion of the proposed construction, environmental resources, procedures, and the Environmental Compliance Plan. During construction the ECT will participate in providing

daily field compliance and Erosion and Sediment Control reviews; submit reports during construction activity based on the permit requirements and time restrictions; provide short training sessions to construction forces on environmental permit requirements; and coordinate environmental project information to the IEM. In addition to the above activities, the Team will develop a water quality monitoring plan that tracks water quality standards as listed in COMAR to protect receiving waters and their associated biota. In the event that standards are exceeded, the Team will notify the IEM and the Administration immediately and resolve deficiencies within 48 hours.

Innovation to Protect Environmental Resources

The Team has experience in incorporating various “best management practices” and other innovative measures to protect and minimize impacts to environmental resources, reduce waste and pollution throughout all phases of a project. Below is a summary of some the innovative practices and techniques that will be implemented for this project in addition to all standard requirements.

- *Orange safety fence and prohibitory signage will be utilized to delineate sensitive features throughout construction and reduce unintended construction impacts.*
- *Redundant ESC measures will be employed near sensitive environmental resources.*
- *Erosion potential will be reduced through detailed phasing, minimizing disturbed area, and reduced stockpiling.*
- *Tree impacts will be reduced through advanced horticultural practices such as root pruning and low height retaining walls.*
- *Grading adjustments and use of steeper slopes to reduce impacts and LOD.*
- *Select use of guardrail or barrier with associated clear zone, slope, and LOD reductions.*
- *Refine SWM and drainage design to reduce impacts and increase water quality benefits.*
- *Refine SWM and drainage design to factor long term maintenance requirements.*
- *Refine SWM and drainage design to provide additional management beyond the IART for NPDES credits.*
- *Develop a site specific hazardous material handling plan including: identifying potential hazardous materials from construction activities, appropriate disposal sites, training for fueling and maintaining equipment within project limits, maintaining fuel spill kits, and procedures and training for emergency action plan.*
- *Use of low noise generating pumping equipment in noise sensitive locations.*
- *Clearing and grubbing operations will generate root mat material/ this material will be stockpiled, screened on site to remove roots and debris, and used for topsoil areas.*
- *On-site re-use of milling or crushed concrete with approval of SHA.*