



DATE: May 14, 2018

SUBJECT: **Request for Proposal (RFP)**  
**Design-Build Contract with Guaranteed Maximum Price (DB w/GMP)**  
**West Campus Parking Structure and Roadway Connections**  
Penn State University Park Campus

TO: Alexander Building Company  
Clayco, Inc.  
Gilbane Building Co.  
Massaro Corp  
PJ Dick

#### **A. INTRODUCTION**

Congratulations, your team has been selected as one of the teams on the long list for the design and construction of the above-referenced project. We invite the above teams to respond to this RFP.

PSU's Screening Committee will review responses to this Request for Proposal, which are due in my office at **Noon EST on June 4, 2018**. We will identify the three teams to be interviewed, via this website, by **June 15, 2018**. Interviews will occur **on July 2, 2018**. The results will be announced at the Board of Trustees meeting on **July 20, 2018** and posted to this website.

Participation in this selection process by submitting firms shall be at no cost or obligation to The Pennsylvania State University (PSU). The University reserves the right to waive any informality in any or all Proposals, and to reject or accept any Proposal or portion thereof. Additionally, the University may also hold all proposals for up to 45 days and to reject all proposals or to award on the basis of technical merit and the best interests of the University.

#### **B. PROJECT OVERVIEW AND GOALS**

Penn State University Park Campus' capital plan is increasing the demand for vehicle parking. This project is an important initial project phase to support ongoing growth within UP's West Campus. This new project will accommodate the pending growth as well as the extension of White Course Drive and a new roadway connection from West College Avenue to the parking structure. The scope of work will also include expansion of the existing stormwater detention basin (to support this project and future buildings) on West Campus. The University commissioned Tim Haahs, McCormick Taylor, and NTM Engineering to complete a Program for the aforementioned improvements. The Program was completed in March of 2018 and included conceptual massing and site locations for the west campus parking structure and preliminary alignments for the roadway connections. To assist in your Proposal/RFP response, the Program is included in this package.



Currently the UP Campus has approximately 15,900 surface parking spaces and approximately 3,900 parking spaces within four parking structures. This new parking structure will accommodate approximately 1,500 to 1,670 parking spots. The goals of the project include the following:

- Design and construct a pre-cast concrete parking structure that supports the ongoing West Campus Master Plan. The project will define and execute car/pedestrian/CATA connection and landscape/site design connections to future buildings.
- The garage design will be aesthetically pleasing, considering the best ways to utilize the site layout/topography, and has appropriate massing relative to its location and adjacent buildings.
- Increase the overall parking capacity on campus with a highly functional and economical roadway alignment and parking structure.
- Provide careful consideration of vehicular and pedestrian traffic flow to maintain a safe campus environment – both during construction and in the completed design

The total project budget range for the program, including soft costs, is \$59,000,000. We anticipate a construction contract award in September 2019 and substantial completion by November 2020.

### **C. PRE-CONSTRUCTION PRELIMINARY SCOPE OF WORK**

To help inform your Proposal, including the creation of your proposed Design-Build (DB) team, we are providing a preliminary scope of pre-construction services for this project. The project scope of work will include, but is not limited to the following:

- **Program Validation and Concept Design.** The DB Team will review and comment on the completed program and West Campus Master Plan, including verification of the capacity based on traffic and parking study data provided by the University, thorough evaluation of the two (2) proposed sites for the parking structure and validation of the concepts in the feasibility study for the parking structure, roadway connections, and stormwater basin, including stormwater reuse. The Concept Design effort will include study of multiple garage floorplate and ramping options, 3D conceptual building options, and conceptual design of traffic and pedestrian flows for the various site and floorplate options. To help determine the preferred site and concepts, provide a cost/benefit analysis and a risk management plan for both sites that takes into consideration several key factors in addition to the project goals which include, but are not limited to: 1) effective integration with the most current West Campus Master Plan, 2) initial cost and total cost of ownership, 3) schedule, 4) safety, 5) aesthetics, 6) operational efficiency of the parking structure and roadways, 7) safe and efficient movement of pedestrians, transit and personal vehicles, and bicycles on and thru West Campus (including maximizing utilization of Westgate Building as the pedestrian/bike link between core campus and west campus), and 8) impacts to the existing infrastructure, environment, parking and University operations on West Campus during and after construction.
- **Survey.** Under the supervision of a professional surveyor licensed in Pennsylvania, survey the general area within the limits of the project as necessary to complete the project in its entirety, including any additional right-of-way that may be necessary. Some of the survey tasks include but are not limited to:



- Coordinate with PennDOT, Borough of State College, and Ferguson Township to obtain any approvals, permitting, and existing plans of local and state roads that will be affected, including right-of-way and available survey control points needed to complete the survey.
  - Conduct a PA One-Call and obtain a design serial number.
  - Tie-in to PA State Plane Coordinate System and establish control points.
  - Locate and identify utilities based on the PA One-Call, field evidence, existing mapping and coordination with Penn State.
  - Detailed information on existing sanitary and stormwater facilities including pipe types, size, inverts, and condition based on field evidence.
  - Locate all flags placed to delineate environmentally sensitive areas.
  - Locations of existing trees with accurate drip line and species.
  - Incorporate any other mapping as provided by OPP.
  - Prepare an AutoCAD topographic base map suitable for design purposes.
    - Incorporate Penn State CAD Layer Standards provided by OPP.
    - Incorporate Penn State CAD Text Standards provided by OPP.
- **Geotechnical Investigation.** Under the supervision of a professional engineer licensed in Pennsylvania, conduct a geotechnical investigation within the limits of the project that is required for design and construction of the roadway connections, stormwater basin, and parking structure. The West Campus area has a history of sinkholes. With this in mind, the Design-Build team will be expected to have a geotechnical engineering firm with the requisite qualifications and experience to identify the presence of solid rock and void locations and presence of existing sinkholes and how these conditions will impact foundation design, prior to construction. Additionally, the DB team will use this information to provide recommendation of the most cost-effective engineering solutions to mitigate solid rock/void locations/sinkholes that are identified during the design phase or found during construction.
- **Environmental Assessment.** Conduct a Phase I Environmental Assessment that is in general conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation E 1527-13. Identify and address any environmentally sensitive areas that require special mitigation measures. If necessary, conduct a Phase II Environmental Assessment. The environmental assessment will be coordinated with representatives from Penn State Environmental Health & Safety, Engineering Services, and the applicable local and state authorities having jurisdiction.
- **Design of Parking Garage, Roadway, and related site and landscape design features.** Under the supervision of the appropriate professional engineer(s) and architect(s) licensed in Pennsylvania, develop schematic design plans, design development, and construction documents including specifications in accordance with Penn State Design and Construction Standards and any applicable local, state, and/or federal regulations and requirements. Scope will include evaluation of multiple exterior garage aesthetics, roadway design, intersection and signalization design, and design of stormwater management feature(s) to support this project and future West Campus buildings (identified by PSU). Submit design documents at the end of each phase for review by Penn State; allow at least two (2) weeks for each design review. The design shall include detailed



site logistics and traffic control plans to ensure safety is maximized and operational impacts on and near West Campus are minimized during construction, including accessibility and parking.

- **Cost Estimating.** Develop and maintain a project cost estimate for the program validation phase and during each phase of design. The estimate shall include the Design-Builder Fee, General Conditions, contingency, and a 10% owner's contingency unless directed otherwise by the Penn State Project Manager.
- **Scheduling.** Create and maintain a detailed project schedule. The schedule shall clearly depict all tasks, including durations and dependencies, and the tasks that are on the critical path.
- **Project Coordination.** Coordinate with the appropriate internal and external stakeholders to ensure the design and construction complies with Penn State Design and Construction standards and any applicable local, state, and federal regulations and requirements. In addition to the Penn State Project Manager, some of the key stakeholders include, but are not limited to, representatives from Penn State Transportation Services, Engineering Services, Campus Planning and Design, Utility Services, Environmental Health & Safety, Enterprise Network & Communication Services, Intercollegiate Athletics, Campus Recreation, Pennsylvania Department of Transportation, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Labor & Industry, Borough of State College, Ferguson Township, Centre County Conservation District, CATA, Centre Region Planning Agency, Public and Private Utility Providers, and McCormick Taylor who is currently working on the Traffic Impact Study for the project. The Traffic Impact Study is expected to be completed by January 2019.
- **Land Development and Permitting Approvals.** Assess and determine the need for land development and permitting approvals. Prepare and submit applicable documents to the appropriate agencies for review and approval. Coordinate and attend meetings as required to support this effort and obtain the necessary approvals, including presentations to municipalities.

#### D. RFP ATTACHMENTS AND REFERENCED STANDARDS

- **West Campus Parking Structure & Roadway Connections Program**, dated 3/23/2018, attached.
- **Form of Agreement.** *Standard Design-Build Agreement and General Conditions*, attached.
- **Design Phase Deliverables.** Reference this document under the heading *00 51 00 MISCELLANEOUS FORMS* at the following link:  
<https://wikispaces.psu.edu/display/OPPDCS/Division+00+-+Procurement+and+Contracting+Requirements>
- **Office of the Physical Plan (OPP) Standards.** The web sites [www.opp.psu.edu](http://www.opp.psu.edu) and <https://wikispaces.psu.edu/display/OPPDCS/Design+and+Construction+Standards> provide information regarding specific design submission requirements and standards, of the University. Please review to ensure that your team is able to deliver a compliant building.

#### E. SELECTION AND IMPLEMENTATION MILESTONES

- RFP Issued to Long-Listed Teams: May 14, 2018
- **Site Visits:** **Schedule with Kurt Coduti**
- Submission of Design-Build Proposals Due: June 4, 2018 (at Noon)
- **Post Short-List results and Interview notice:** **June 15, 2018**
- A/E Team Interviews: July 2, 2018 (Univ. Park, PA)
- **Board of Trustees Selection of Team + Post Results:** **July 20, 2018**
- Contract Award / Letter of Intent: July 23, 2018
- **Construction start date:** **September 16, 2019**
- Project Occupancy: November 20, 2020

#### F. PRE-PROPOSAL SUBMISSION CONTACT

We encourage you to visit the site and discuss the project with representatives of the user group in order to understand our goals and the major issues driving this project.

Please contact Kurt Coduti, Facilities Project Manager, at [khc3@psu.edu](mailto:khc3@psu.edu) or 814-863-4960 to schedule your site visit and with any programmatic questions. Contact John Bechtel, Assistant Director of Design and Construction, at [jrb115@psu.edu](mailto:jrb115@psu.edu) with and Design/Build process or contract questions. Contact Greg Kufner with any campus planning, design or general design/build process questions.

#### G. PROPOSAL REQUIREMENTS

Deliver thirteen (13) hard copies of your proposal and one (1) digital copy on a thumb drive to:

**Greg Kufner, AIA, NCARB University Architect – See address, below.**

**Hard copies of the Proposals are due June 4, 2018 at Noon, Eastern Standard Time. A PDF version of your proposal should be included on a thumb drive within your submission. Proposals received after this date and time may be automatically rejected. Proposals shall be provided in an 8.5”x 11” format. Limit submission to a cover letter plus twenty (26) single-sided pages maximum (13 double-sided). Double-sided printing is strongly encouraged.**

**A cover letter shall be provided from the proposed leader(s) of the Candidate Team submitting. The cover letter should be one page maximum. The cover letter should include the following:**

- A. This letter should establish the contact information (address, phone, and e-mail) for your team’s main point of contact
- B. Primary office location of the submitting candidate team
- C. A concise summary as to why your team is best suited for this project
- D. Statement of certification that all information provided in your submittal is accurate

**Collate and bind proposals according to the following four (4) Sections:**

Proposals shall follow the below format, in the order stated to ensure that all pertinent information necessary for evaluation is included and easily comparable by Selection Committee. The cover letter, table of contents, and divider pages will not count towards the RFP page limitation. OPP encourages you to be as brief as possible without sacrificing accuracy and completeness.

**\* Note 1: As applicable throughout proposal, provide professional credit to architectural and design partners (including design architect, architect of record, parking garage consultant) for all projects discussed within the proposal and for all project images shown.**

**Section 1.0 –TEAM STRUCTURE**

- A. Identify DB firm and architectural/ engineering/ garage/roadway consultant firms, size of prime firm, each firm’s role on this project, and each firm’s qualification and experience on similar projects. Identify past collaboration between DB firm and key design and construction consultants, including number/ value of projects.
- B. Provide team organizational chart. Include all design and build firms, and provide the name and role of key team members. Clearly identify which team members are designated for leadership positions on the team. Please highlight Diverse Business Enterprise Program (DBE) representation on your team.

Note: Penn State uses TIBA Parking Systems technology in the existing parking structures and expects to use this technology in the new parking structure for access and revenue control. Signature Control Systems (SCS) is the only authorized vendor in this region of Pennsylvania for the installation of TIBA technology. As a result, SCS will need to be a member of the Design-Build team to install TIBA Parking Systems technology.

- C. Provide resumes, including role descriptions, of key team members identified in the organizational chart. Include registrations/ certifications, educational background, years of experience, relevant project experience and define each key team member’s role on each project. Be specific about the roles and on-site participation for each team member. Include at least two client references for each key team member.

**Section 2.0 – TEAM QUALIFICATIONS**

- A. Provide a summary of qualifications and expertise of the firms with specific emphasis on:
  1. Design Excellence, including national recognitions.
  2. Distinguishing factors of team differentiation.
- B. Please highlight five (5) relevant projects within the last ten (10) years that convey your team’s expertise with this type of project and your ability to deliver a Design/Build project. Show illustrative representation of the example projects, particularly those highlighting the work of your team’s proposed Lead Design Architect. Include, at least, the following information:



1. Number of parking spaces
  2. Description of roadway improvements and sitework, as applicable
  3. Project budget and final project cost
  4. Design and construction delivery method (Design-Bid-Build, CM at Risk, Design-Build)
  5. Date of completion
- C. In matrix form, show the participation of individuals from the proposed team on the identified projects. List team member's respective role on each of the example projects.
- D. Briefly describe your proposed methodology to help address PSU's Diverse Business Enterprise Program (DBE), including outreach, and how you propose to maximize DBE firm participation within your proposed team. DBE requirements can be found in this link: <https://opp.psu.edu/planningdesignconstruction/diverse-business-enterprise-program-dbe>
- E. List errors and omissions insurance coverage limits of the lead/ prime entity of the candidate team. Provide information on errors and omissions claims in the last (7) seven years.
- F. Provide historic breakdown of project performance. Include project delivery method, history of project budgets compared to completed construction cost, history of change orders, average response time to RFIs, and any other key project profiles relevant to this project.
- G. Acknowledgment of your review and acceptance of the attached Form of Agreement, *Standard Design-Build Agreement and General Conditions*, ensuring that your firm accepts all terms and conditions as written. In submitting a proposal for this project, you concur, without exception, with all terms, conditions and provisions of this Form of Agreement.

### **Section 3.0 – PROJECT APPROACH AND SCHEDULE**

- A. Briefly outline your project specific Design-Build process and approach, including planning, managing, and executing the project. Summarize your team structure and governance as it relates to decision making. Please share any experiences your proposed team members have on projects delivered in a more integrated and lean approach. Be specific with you approach to Lean design and construction principles (Last Planner, CoS, A3's, etc.) and suggest those you would expect to use for this project. Identify areas for enhanced collaboration between the DB team and Penn State.
- B. Describe your DB Team's proposed project approach to:
1. Helping to define project goals and expectations and describe methodology for achieving goals/ expectations from concept design through construction.
  2. Creating a collaborative design and construction process between constructors, architects, garage/roadway/engineering consultants, and PSU stakeholders.
  3. Briefly describe your approach to Penn State reviews, PSU design reviews, and jurisdictional reviews for the parking garage, roadway, and related site improvements.
  4. Use of BIM and other technology/digital tools through design and construction.



- C. Outline the cost estimating and cost control methodology you plan to implement on this project. Discuss your experiences and preferences with respect to Shared Savings contracts.
- D. Describe your team's experience with Parksmart Green Garage Certifications or other commitments to sustainable design as it pertains to this project.
- E. Provide a brief description of your approach to project safety (include your EMR). Does your team plan to use Prevention through Design (PtD) techniques to improve both construction and building operations safety? Feel free to cite examples from previous projects.
- F. Provide a proposed design and construction milestone schedule for this project in graphic form for the project, allowing three weeks for and necessary Penn State University reviews. This can be printed on an 11x17 fold-out and only count as a single page.
- G. Provide a summary of your scheduling processes and techniques. Please describe your understanding of the key schedule drivers for this project. Provide a statement validating your entire team's availability to appropriately staff the anticipated workload.

**Section 4.0 – PROJECT-SPECIFIC KEY DRIVERS AND IDEAS**

- A. Briefly demonstrate your understanding of the project. Provide any observations of the project program and any project-specific design ideas, thoughts or considerations.
- B. Identify and discuss design and construction issues that are the key drivers of this type of project and illustrate these with examples from your previous work. Please identify and discuss specific lessons-learned that you plan to apply to this project from your previous experience, such as: permitting, schedule reduction opportunities, vehicle and pedestrian traffic, construction site logistics, or any other subjects you deem pertinent.
- C. Discuss example parking project(s) that best indicates the appropriate a high quality of design and planning for a parking garage.

We appreciate your cooperation and interest in preparing this material. We look forward to working with the selection team and you on the development of this important project.

Sincerely,

Greg Kufner, AIA, NCARB  
University Architect  
The Pennsylvania State University  
206 Physical Plant Building, University Park, PA 16802  
Phone: 814 865-4402, Email: [gak21@psu.edu](mailto:gak21@psu.edu)

cc. Screening Committee



**PennState**

Department of Transportation Services

# West Campus Parking Structure and Roadway Connections Program

Office of Physical Plant

Penn State University Park

Timothy Haahs & Associates, Inc.  
NTM Engineering, Inc.  
McCormick Taylor, Inc.  
Draft – January 26, 2018  
Pre-Final – February 20, 2018  
Final – March 23, 2018

March 29, 2018

Mr. Kurt H. Coduti  
Project Manager  
Design and Construction  
The Pennsylvania State University  
108 Physical Plant Building  
University Park, PA 16802

RE: **West Campus Parking Structure and Roadway Connections Feasibility Study  
University Park, PA**

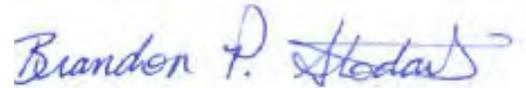
Dear Mr. Coduti:

It has been our pleasure to serve you and The Pennsylvania State University (Penn State), in conjunction with McCormick Taylor and NTM Engineering, to provide this feasibility study for a new parking garage and the associated roadway realignment and connections, to serve the West Campus. The purpose of the study is to determine the viability of providing more parking through construction of a new parking structure, understand the impacts to the surrounding road network, and account for all current and future stormwater management needs.

Attached is our final report detailing our findings and recommendations.

If there is any comment on the information provided, we would be happy to discuss.

Respectfully Submitted,



**Michael T. App, AIA, LEED AP, NCARB, ParkSmart Advisor**

Director of Architecture, Timothy Haahs & Associates (THA)

**Scott A. Brown, PE, D.WRE**

Senior Project Manager, NTM Engineering, Inc. (NTM)

**Brandon P. Stodart, PE**

Manager, Transportation Engineering, McCormick Taylor, Inc (MT)

CC: Rob DeMayo, Director of Transportation Services, Penn State  
Steve Watson, Director of Campus Planning and Design, Penn State  
Greg Kufner, University Architect, Penn State  
Rob Watts, PE, PTOE, McCormick Taylor, Inc. (MT)  
Brian St. John, PE, PTOE, McCormick Taylor, Inc. (MT)  
Tim Haahs, PE, AIA, Timothy Haahs & Associates (THA)  
Todd Helmer, PE, Timothy Haahs & Associates (THA)

# TABLE OF CONTENTS

|  |   |
|--|---|
| <b>1. INTRODUCTION</b> .....                                       | 1 |
| 1.1. Executive Summary   |   |
| 1.2. Committee Charge Letter                                       |   |
| <b>2. PROJECT INFORMATION</b> .....                                | 4 |
| 2.1. Background and History  |   |
| 2.2. Program Issues and Objectives                                 |   |
| 2.3. Clients and Services  |   |
| 2.4. Existing Facilities/Conditions                                |   |
| <b>3. STRUCTURE CONSIDERATIONS</b> .....                           | 7 |
| 3.1. Best Practices  |   |
| 3.1.1. Considerations  |   |
| 3.1.2. Principles  |   |
| 3.1.3. Planning  |   |
| 3.1.4. Site Selection  |   |
| 3.1.5. Conceptual Design   |   |
| 3.1.6. Safety and Security   |   |
| 3.1.7. Architectural Design  |   |
| 3.1.8. Integrated Uses   |   |
| 3.1.9. Sustainable Design Strategies                               |   |
| 3.1.10. Innovation Opportunities                                   |   |
| 3.1.11. Maintenance and Durability Design                          |   |
| 3.1.12. Future Trends  |   |
| 3.1.13. Office of Physical Plant Design and Construction Standards |   |
| 3.2. Project Specifics   |   |
| 3.2.1. Building Codes and Zoning Ordinances                        |   |
| 3.2.2. Parking Demand  |   |
| 3.2.3. Size of Potential Programmed Spaces                         |   |
| 3.2.4. Preferred Structural System                                 |   |
| 3.2.5. Solar Array   |   |
| 3.2.6. Utility Loads   |   |
| 3.2.7. Green Roofs and Rooftop Amenity Spaces                      |   |
| 3.2.8. Underground Facilities                                      |   |
| 3.2.9. PARCS Approach  |   |
| 3.3. Analysis of Developed Concepts                                |   |
| 3.3.1. Concept 1   |   |
| 3.3.2. Concept 2   |   |
| 3.3.3. Concept 3   |   |
| 3.3.4. Concept 4   |   |
| 3.3.5. Recommended Concept   |   |

|   |    |
|---|----|
| <b>4. SITE &amp; ROADWAY CONNECTIONS CONSIDERATIONS</b> ..... | 30 |
| 4.1. Site & Roadway Connections                               |    |
| 4.2. Pedestrian and Vehicular Access and Parking              |    |
| 4.3. Zoning and Permitting                                    |    |
| 4.4. Site Utility Requirements                                |    |
| 4.5. Special Site Considerations                              |    |
| 4.5.1 Traffic Characteristics of the Parking Garage           |    |
| 4.5.2 Future Roadway Connection Options                       |    |
| 4.5.3 Traffic Analysis  |    |
| 4.5.4 Preferred West College Avenue Connection Option         |    |
| 4.5.5 Municipal and Agency Coordination                       |    |
| 4.5.6 Environmental Assessment                                |    |
| 4.5.7 Hazardous Material                                      |    |
| 4.5.8 Roadway Drainage  |    |
| 4.5.9 Erosion and Sediment Pollution Control                  |    |
| 4.6. Stormwater Management                                    |    |
| 4.6.1. Regulatory Summary                                     |    |
| 4.6.2. West Campus Basin Redesign                             |    |
| 4.6.3. Stormwater Management for the Thompson Run Watershed   |    |
| 4.6.4. Conveyance System Upgrades                             |    |
| 4.6.5. Utility Impacts  |    |
| <b>5. BUDGET INFORMATION</b> .....                            | 54 |
| 5.1. Estimated Project Budget                                 |    |
| <b>6. ESTIMATED PROJECT SCHEDULE</b> .....                    | 55 |

# APPENDICES

## A: Structure

### A.1: Concept 1:

A1.1: Site Plan

A1.2: Ground Tier Plan

A1.3: Ground Tier Plan, with Transit Station, Dining, Retail/Office Shell

A1.4: Typical Tier Plan

A1.5: Top Tier Plan

### A.2: Concept 2:

A2.1: Site Plan

A2.2: Ground Tier Plan

A2.3: Ground Tier Plan, with Transit Station, Dining, Retail/Office Shell

A2.4: Typical Tier Plan

A2.5: Top Tier Plan

### A.3: Concept 3:

A3.1: Site Plan

A3.2: Ground Tier Plan

A3.3: Partial Ground Tier Plan – West Corner

A3.4: Partial Ground Tier Plan – North Corner

A3.5: Partial Ground Tier Plan – South Corner

A3.6: Partial Ground Tier Plan – East Corner

### A.4 Concept 4:

A4.1: Site Plan

A4.2: Ground Tier Plan

A4.3: Typical Tier Plan

A4.4: Top Tier Plan

### A.5: Rendering, Recommended Concept

A5.1: Concept 1 – View 1

A5.2: Concept 1 – View 2

A5.3: Concept 1 – View 3

### A.6: Best Practices Presentation

### A.7: Green Roofs / Amenity Spaces and Parking Garage / Athletic Fields

## B: Site and Roadway Connections

### B.1: Overview Map

### B.2: Roadway Conceptual Plans

B.2.1: Plan/Profile/Typical Section/Cross-Sections

B.2.2: Design Criteria and Geometry Reports

### B.3: Traffic Figures

### B.4: Municipal

B.4.1: Presentation

B.4.2: Summary and Sign-In

### B.5: Environmental

B.5.1: Historic Resources

B.5.2: Threatened and Endangered Species (PNDI)

### B.6: Hazardous Waste Memo

### B.7: Meeting Minutes

### B.8: Roadway Cost Estimate

C: Stormwater Management

- C.1: Stormwater Policy and Regulations
- C.2: Storm Runoff Peak Rate Management
- C.3: Volume and Water Quality Management
- C.4: Rainwater Reuse Alternatives
- C.5: Stormwater Facility Probable Costs
- C.6: Stormwater Management Analysis Support Documentation
  - C.6.1: HydroCAD Model Data
    - C.6.1.1: Existing and Proposed Basin Data
    - C.6.1.2: Verification Model Data
  - C.6.2: Volume Management Requirement Analysis
  - C.6.3: Rainwater Harvest Volume Capture

D: General Information

D.1: Budget

- D1.1: Cost Estimate – Concept 1, 6 tiers
- D1.2: Cost Estimate – Concept 1, 6 tiers, no solar array
- D1.3: Cost Estimate – Concept 1, 6 tiers, no solar array, shorten by one 48' bay
- D1.4: Cost Estimate – Concept 1, 6 tiers w/ Transit Station & Cafe
- D1.5: Cost Estimate – Concept 1, 5 tiers
- D1.6: Cost Estimate – Concept 1, 4 tiers
- D1.7: Cost Estimate – Concept 2, 6 tiers w/ Transit Station and Cafe
- D1.8: Cost Estimate – Concept 3
- D1.9: Cost Estimate – Concept 4

D.2: Schedule

# 1. INTRODUCTION

## 1.1 EXECUTIVE SUMMARY

Timothy Haahs and Associates (TimHaahs), McCormick Taylor, Inc. (MTI), and NTM Engineering (NTM) were retained by Penn State to provide a feasibility study for the West Campus Parking Garage and a new roadway connection to West Campus from West College Avenue and expansion of White Course Drive. The West Campus garage will be located on the West Campus of the University Park Campus, located in State College, Pennsylvania. While a majority of the roadway work and storm management work occur in the Borough of State College, the stormwater management basin will be located in Ferguson Township and the new tie-in roadway with College Avenue will be along the division line between the township and the borough. TimHaahs evaluated the feasibility study and provided concepts for the garage; McCormick Taylor performed as the civil engineer and roadway planner for the roadway improvements; and NTM provided the Stormwater Management and permitting input. The purpose of this study is to determine the feasibility of the proposed parking garage and roadway connections, considering all aspects, including vehicle circulation, pedestrian connectivity, stormwater management, financial costs, and scheduling.

West Campus is located to the south of North Atherton Street (Business 322), west of Railroad Avenue, and north and east of White Course Drive. West Campus currently has two main use areas: an academic area to the north-east, and a residential area to the south-west. The academic area is home to the Engineering Science and Mechanics Department in the Earth and Engineering Science Building, the Harold and Inge Marcus Department of Industrial and Manufacturing Engineering in the Leonhard Building, The Department of Biomedical Engineering in the Hallowell Building, and The Learning Factory in the Engineering Services Building, the Applied Sciences Building, and the West Research Building. The West Campus Chiller Building serves the academic buildings on this campus, providing chilled water for the HVAC systems in these buildings. Also located in this area is a Bus Terminal owned by Penn State and operated by the Borough of State College, providing a terminal for long distance carriers Trailways and Greyhound.

Based on the 2006 Master Plan documents, there is significant investment planned for this area, with as many as six (6) buildings being added, and one (1) building replaced, resulting in a total area of just over 1.5 million square feet of new academic and professional space.



**Figure 1. 2006 West Campus Master Plan**

A majority of these projects are planned to be constructed on what are currently existing surface parking lots. Additionally, Penn State is planning several other infill type of building projects on the Core Campus, many of which are being built in existing surface parking lots. It is this development of the West Campus and potential loss of parking on the Core Campus that is driving the need for more structured parking, and the reason for the addition of the proposed garage and new roadway connection to West College Avenue that were evaluated in this study.

Per the 2006 Master Plan, the parking garage proposed in this feasibility study is intended to be located just south of the Engineering Science and Mechanics building. The College of Engineering Master Plan is in the process of being re-evaluated and as such was not evaluated as part of this study. Based on initial cost estimates, the overall project will cost between \$50 million and \$80 million to construct. The proposed timeline anticipates the construction of the roadway connections and the parking facility to be complete by fall of 2020.

The following report will be comprised of several sections including: establishment of design parameters, evaluation of the as-built conditions, and recommended action items to provide a safe vehicular and pedestrian experience, while maximizing the proposed parking, based on our observations and analysis of the current conditions on the campus. In addition, considerations to environmental and permitting will be presented as well as an overall project schedule and planning level cost estimate.



Nicholas P. Jones  
Executive Vice President and Provost

The Pennsylvania State University  
201 Old Main  
University Park, PA 16802-1589

814-865-2505  
Fax: 814-863-8583  
npj1@psu.edu

**TO:** Robert J. Demayo, Chair  
David Dorman  
Stephen E. Oskin  
Kurt H. Coduti

Ryan J. Givens  
Steven A. Watson  
Thomas P. Kase



**FROM:** Nicholas P. Jones, Executive Vice President and Provost

**SUBJECT:** New West Campus Parking Structure and Roadway Connections

**DATE:** August 2, 2017

I am writing to ask you to participate in an important programming effort to construct a new parking structure and roadway connections on the West Campus of University Park. This is the first step towards accommodating substantial development for the College of Engineering in this vicinity. I have asked Rob Demayo to chair this committee.

The preliminary plans are to construct a parking structure to provide for 1,350 parking spaces (final count to be validated, based on need), and to house a new bus transit center. There may be opportunity within this project to include some retail amenities such as a small convenience store and/or coffee shop. The site for this structure will be directly to the west of the Earth and Engineering Sciences Building. All site requirements to support this new parking structure need to be considered in the planning to include such needs as bus loading and unloading, adjacent bus parking or waiting locations, and roadways and pedestrian walkways to serve this new parking structure and connect to adjoining campus systems. In addition, a new roadway will be constructed to extend White Course Drive to College Avenue planned along Corl Street.

The total budget for this project is \$35,700,000. The programming effort needs to consider all priority requirements for this project within the budget allocated. Please contact Pamela Garbini, Interim Director, Facilities Resources and Planning if you have any questions or need assistance. It is desired to have this program completed by **February 1, 2018** and submitted to the Facilities Resources Committee (FRC) and Project Decision Review Board (PDRB) for review and approval.

Thank you for your participation in this important project.

Cc: Facilities Resources Committee  
John Papazoglou  
William Sitzabee  
Lisa Berkey  
Pamela Garbini

## 2. PROJECT INFORMATION

### 2.1 BACKGROUND AND HISTORY

A master plan developed in 2006 for the area of the University Park campus referred to as West Campus identified the potential for the addition of seven (7) buildings, six (6) new and one (1) replacement, totaling over 1.5 million square feet. The master plan was developed as part of an evaluation of the long-term potential for West Campus to expand to meet future academic space needs, specifically targeting academic and research space for the College of Engineering. The latest College of Engineering Master Plan is currently in the process of being re-evaluated. As such, any updates from this current update are not accounted for as part of this study.

The envisioned expansion of core academic space to west campus was a primary driver in the design of the Westgate Building (formerly known as the IST Building), which completed construction in 2003. The building was designed to bridge over Atherton Street with an accessible ramp serving as a “campus connector” for pedestrians and bicyclists.

A key component of the 2006 West Campus Master Plan was the consolidation of existing surface parking into a new parking garage to create building sites. In 2008, a White Course Drive extension and tie-in study was undertaken which included a parking garage with six levels totaling 1,350 spaces. The 2008 study included the potential traffic associated with a future Ice Arena and Child Care Center. The plan also illustrated the potential for the garage to accommodate the bus terminal along Atherton Street. In order to address vehicular ingress and egress to the new parking garage, a western connection to West College Avenue was included in the plan with a possible transit-only section. Traffic forecasting completed as part of the 2008 study showed that approximately 15,000 vehicles per day would utilize a connection between North Atherton Street and West College Avenue through West Campus. Due to concerns with this high volume of short-cutting traffic, the road connections only provide direct access to the parking garage with transit and emergency service vehicles as the exception.

The acquisition around this same time of the former Smith Properties along Atherton Street provided an opportunity to include planning for further redevelopment along this corridor with an academic building site and possible mixed-use building to serve as a transition with the West End area of the Borough. This future growth on the West Campus and resulting parking need could be supplemented via the integration of parking into the proposed mixed-use building.

The 2006 West Campus Master Plan was subsequently incorporated in the 2007 University Park Campus Master Plan Land Use Update, the 2007 State College Borough West End Plan, and State College Borough’s 2013 Downtown Master Plan.

## 2.2 PROGRAM ISSUES AND OBJECTIVES

The objectives for the construction of the parking garage, based on the project background and history, are as follows:

- To meet the current and future parking needs of the area in support of the anticipated traffic (vehicular, bus, bicycle, and pedestrian) due to further development on West Campus and Core Campus, and the loss of existing parking as a result of the new development.
- To provide access to the proposed parking garage.
- To restrict the traffic to patrons of the garage, and to transit, eliminating the ability of “cut-through” traffic except for transit and emergency services.

In addition to the objectives of the parking structure as highlighted above, the supporting roadway network may provide access to adjacent property uses (West Campus building sites, and future potential uses for White Course Apartments and the vacant OW Houts site). It is anticipated that the final parking garage configuration will provide approximately 1,670 vehicles, as is depicted on the appendix exhibits for Concept 1 and Concept 2. State College Borough has expressed their desire to keep the Bus Depot in its current location. Therefore, the Bus Depot is not considered in this document as a component of the West Campus Parking Structure.

In accordance with the Universities Stormwater Management Policy and as outlined in Water Resource Publication OPP-WRP-SW-WC:(3)-2016) this project will trigger a requirement to reconstruct the West Campus Stormwater Basin. Therefore, an additional objective of this project will be construction of an enhanced stormwater basin to manage runoff for full buildout inside the West Campus Drainage Area in accordance with the 2006 West Campus Master Plan.

## 2.3 CLIENTS AND SERVICES

The garage will provide parking primarily for Faculty/Staff permit holders for the West Campus Academic Buildings. Secondary uses may include visitors, students, and special events patrons. One parking layout scenario would be to segregate the parking so that the Faculty/Staff permit holders would have dedicated parking on the upper parking levels, while the ground level would be more transient in nature, with short term parking for visitors.

The parking garage will be under the jurisdiction of Penn State Transportation Services. However, there may be other tenants of the spaces within the garage, such as the entities served by the Bus Depot, the operators of the café, and those that may occupy any future ground level office/retail spaces. Maintenance responsibilities for the parking structure will fall under the Office of Physical Plant and Transportation Services.

## 2.4 EXISTING FACILITIES/CONDITIONS

The existing area can be found in **Figure 2** below. The red outline depicts the parking garage location shown in the 2006 West Campus Master Plan.



**Figure 2: Bird's Eye view of the site**

The academic portion of West Campus is bounded by North Atherton Street (Business 322) to the east, the golf course and recreational fields to the north, the Borough of State College to the south, and the White Course Apartments to the west. Per the 2006 West Campus Master Plan, the proposed parking structure will be located on an existing Red A surface parking lot that has 185 parking spaces. Adjacent land uses include additional Red A parking lots with 638 spaces, a Brown parking lot accessed from the West Campus housing area, academic buildings including the following: the Engineering Science and Mechanics Department in the Earth and Engineering Science Building, the Harold and Inge Marcus Department of Industrial and Manufacturing Engineering in the Leonhard Building, The Department of Biomedical Engineering in the Hallowell Building, and The Learning Factory in the Engineering Services Building, the Applied Sciences Building, the West Research Building, and the West Campus Chiller Plant. The White Course Apartments (student housing) is also located within the project area.

The only access to the Red A parking facilities is via North Atherton Street to White Course Drive. In addition, the White Course Apartments and Brown parking lots are accessed only from the south via West College Avenue to Patterson and Sparks Streets. Drainage and stormwater for a majority of the site is accommodated by the existing stormwater management basin that is currently operating above capacity.

The existing Red A surface parking lots currently provide a total of 823 spaces with 770 regular, 11 motorcycle, 29 ADA spaces, 2 reserved spaces, and 11 service vehicle spaces. With the addition of the new academic buildings and proposed garage, 771 spaces will be lost.

There are only a few utilities that cross the proposed building pad; most utilities run around the proposed building pad. There are two domestic water supply lines that cross the building pad: one on the eastern end that will need to be relocated, and the other on the western end that will likely be able to remain as is. There is also a domestic water supply line in the proposed stormwater management basin expansion area that will need to be relocated.

The site is generally flat and the geotechnical report for subsurface borings has not been received as of this writing of this report (boring effort is still underway).

## 3. STRUCTURE CONSIDERATIONS

### 3.1 BEST PRACTICES

Parking Garages have evolved significantly over the last 50 years, from mere storage facilities for cars, to mixed-use buildings that make significant architectural statements. Furthermore, parking planners have recognized that differing user groups will have different requirements for the design of the garage. The following is an explanation of the information presented to Penn State, included as **Appendix** item **A.8**.

#### 3.1.1 Considerations

In a university setting, there are several factors to consider when planning and designing a parking garage:

- Trends in growth patterns
- Vehicular and pedestrian circulation
- Security, including passive and active measures
- Expansion, including horizontal and vertical
- Cost, both initial and life cycle
- Operational and Maintenance Considerations
- Code requirements and Zoning Ordinance requirements
- Parking Access and Revenue Controls Systems (PARCS) equipment
- Parking Technology and Transit Related Technology
- Sustainability strategies
- Trends in Mixed-Use
- Trends in Transportation Evolution and Repurposing of Parking Structures
- Prevention Through Design

While many of these considerations are good practice for any parking garage, there are additional nuances to University parking when analyzing the specific user groups, such as:

- Faculty / Staff
  - Faculty parking is usually best in close proximity to the core campus academic centers.
  - Faculty/Staff spaces tend to turn over less frequently, and are often “all-day” occupancy.
- Students
  - Resident parking is long-term storage.
  - Commuter spaces turn over much more frequently, and are often only “half-day”, or even less.
- Visitor
  - Visitors need parking at specific “interface” locations, such as Admissions Offices, or Procurement Offices, or Campus Police Offices.
- Special Event
  - Such as a sporting event, a fine arts (music or theatre) event, or a school event like commencement.

- Special events tend to have intense “surge” periods where all patrons are entering / exiting at the same time.

### 3.1.2 Principles

Recognizing the trends in real estate, and the push towards more walkable development, simply designing a very efficient parking garage is not enough. Parking garages are often the catalyst for the rest of the development. Therefore, the parking garage has a responsibility to set the architectural tone, and hint at the environment that will eventually occur.

“If you plan for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places.”

- Fred Kent, Founder and President of Project For Public Spaces

Therefore, a people-rich development requires the following design guidelines, which we have established to be in concert with the above:

- Promote Foot-Traffic
- Provide Security
- Create a Sense of Place

The principles that help to make the parking garage safe, secure, and energized are explained in the sections below.

#### **RECOMMENDATION**

*The proposed parking garage must enhance the academic quadrangle, with complimentary architecture, lighting and other security measures, and a well-designed layout that encourages ease of access from the garage to the other buildings that the garage serves. Additionally, if desired, patron amenities such as a café, a transit station, and potential retail or office space, could be included thereby creating a place that is safe, secure, and energized.*

### 3.1.3 Planning

One question that the University will need to answer is, “How Many Spaces Do We Need?” An analysis of the available existing parking and the existing parking need, coupled with a projection of that need into the future, would project the future need for parking and the target size for any new parking facilities required to address that need. Such an analysis requires a variety of assumptions about future growth, occupancy of new buildings, parking permitting trends, parking space utilization, and traffic capacity of the roadway system.

The study of parking and traffic access for West Campus conducted in 2008 by McCormick Taylor suggested that the parking facility size would be limited according to the traffic capacity of the surrounding roadway network. The study incorporated a variety of assumptions about land development and the arrangement of roadway connections to West College Avenue and Blue Course Drive. The study assumed that the Penn State Ice Arena and Child Care Facility would be developed on University-owned parcels north of West College Avenue and east of Blue Course Drive. The study suggested that approximately 1,350 spaces could be built before traffic capacity would be exceeded at key intersections.

As part of the current feasibility study, McCormick Taylor delivered to Penn State University a high-level Parking Utilization Tool. The Tool is scenario-based and provides the user with the opportunity to vary many assumptions about parking usage and University development, with the result being a projection of the net parking surplus or deficit. The number of spaces in the West Campus Parking Structure is one of the variables. The amount of development and occupancy assumptions of the new West Campus buildings and overall growth of the University's parking need are other variables. The initial scenario run by McCormick Taylor utilized assumptions that were illustrative and were not verified by the University. This initial scenario assumed that the West Campus Parking Structure envelope could contain up to 1,670 spaces—based on a planning-level parking garage design by TimHaahs.

Subsequent changes in the assumptions about West Campus Development, reduction of other parking lots on the Core Campus, the need for visitor parking, etc., have been tested by the University to construct additional parking need scenarios. Using the high-level Parking Utilization Tool, these scenarios show that the West Campus Parking Structure should contain between 1500-1600 parking spaces to accommodate these assumptions.

### **RECOMMENDATION**

*In consideration of the 2008 Traffic Study and initial assumptions used in the Parking Utilization Tool, the largest parking structure under consideration provides 1,670 spaces. As such, this number of parking spaces was used as an “upper threshold” in many of the transportation analyses that inform this programming document.*

*Some of the information needed to accurately input all assumptions into the high-level Parking Utilization Tool—e.g., timing of employee growth within the College of Engineering, core campus parking lot space reductions, other building renovation projects—are not completely confirmed at this time. However, to prepare for a continuously growing campus, and in order to ensure the long-term adequacy of the parking supply, the University's Master Plan for growth and ongoing development program should better incorporate the impact and accommodation of parking, and plan the West Campus Parking Structure to the currently forecasted need.*

*It should be understood that the parking structures considered in this Program Statement are not vertically expandable, and there may be the need to construct another parking garage in the future. The additional parking facilities will be a function of the scope of development that the University and its Colleges will propose in subsequent Master Planning efforts. For instance, the College of Engineering Master Plan is currently being re-evaluated by the University and could significantly affect the ongoing parking needs on West Campus.*

#### **3.1.4 Site Selection**

In order to properly locate the proposed parking garage, several things about the site must be understood. The context of the site must be considered, with adjacent uses identified, especially the location of the primary destinations of the users. The size of the property will dictate the size of the footprint of the parking garage. The subsurface conditions shall be identified, including the structural capacity of the soils, locations of underground utilities, and any areas with contamination. Access to the garage will be a result of the proximity to and type of the surrounding road network.

Subsurface conditions will be investigated and analyzed in the design phase. For the purposes of this study, it was assumed that the garage would need a deep foundation system, such as an auger-cast pile system. No further assumptions were made in regards to the soil capacity or existence of contamination.

An analysis of the topography on the site shows that the building pad for proposed parking garage Concept 1 and Concept 2 would be the highest relative point. The building pad for proposed parking garage Concept 3 would be into a 10'-15' berm.

While there are utilities present near the proposed building pad, most do not cross the building pad in any significant way, which should result in a less expensive construction cost.

Considering the layout of the West Campus, the proposed building pad creates a “linchpin” between the academic portion and the residential portion of West Campus. The proposed location also allows for the most future growth by making available the most building pads for additional academic buildings.

### **RECOMMENDATION**

*We recommend that the road network for the West Campus be expanded, extended, and realigned per the appendix exhibits to accommodate the traffic that is served by the parking garage, making access easier and safer, with better management of stormwater runoff.*

### **3.1.5 Conceptual Design**

All concepts for the parking garage are planned to meet the International Building Code requirements for natural ventilation, and therefore be classified as an “open parking garage.” This will avoid any need for mechanical ventilation and will avoid the need to provide an automatic sprinkler system.

The garage is planned to be a precast concrete structure, which allows for a long-span layout, reduces the number of structural columns.

Due to the size of the parking garage, and the location of “destinations” from the garage, the study team has proposed that this garage have three egress stair towers, and of these, two (2) included elevators.

Zoning ordinances often limit the size of the building being constructed on the site by requiring setbacks and restricting the height. These requirements have a direct impact on the amount of parking that can be provided by the proposed parking garage. Good planning will maximize the available stalls by creating an efficient layout. Efficiency in the layout of the parking garage is directly proportional to the cost of the parking garage. A good layout will also create an ease of vehicular access through the parking garage. The inherent wayfinding that results from a good layout will lead to an ease of vehicular access through the parking garage. Separation of the vehicular and pedestrian traffic will also promote walkability and a sense of safety. A good layout will also minimize the chance of vehicular and pedestrian conflicts, and lead to better pedestrian wayfinding.

The proposed garage is not restricted in the size of the area of the garage by the Borough of State College zoning ordinance. However, it is limited by parking industry standards and structural system guidelines. The garage has been planned at approximately 336 feet long, which is the generally accepted length allowed before an expansion joint would need to be introduced. Similarly, the garage has been planned to

be 4 bays wide, which is the generally accepted width allowed before an expansion joint would be required.

For the height of the parking garage, the zoning ordinance for this portion of the West Campus allows a building to be 60'-0" tall. The garage has been planned to be six (6) tiers, with the top tier at an elevation of 59'-4" above the ground tier. The parapet wall for this top tier would be an additional 4'-0", making the "body" of the garage approximately or approximately 63'-4" tall. Elevator and stair towers would be an additional 12'-8", resulting in these towers being approximately 72'-0" above the ground tier. Through discussions with representatives from the Borough of State College, the study team discovered that the Borough does not count the height of stair/elevator towers against the overall building height, nor does it consider the parapet height. Thus, it is our understanding that the garage would not require a variance to be in compliance with the zoning ordinance.

The garage is designed as a single-helix type of ramp design. A single helix system is basically one turning path, as compared to a double-helix, which has two turning paths. This type of ramping system allows for more of the parking bays to be a flat plate, which is generally recommended in order to maximize parking, as well as provide a larger area with clear sight lines. Not only is more parking provided, but the environment is considered safer. Six (6) tiers is generally accepted by the parking industry to be the maximum height allowed before the functional design would be revised to a double-helix ramp design.

The height of the garage is derived from the following assumptions: The ground tier to second floor tier dimension would be 16'-0" to allow for future ground amenity space, anticipating the need for high finished ceilings and HVAC ductwork. The second tier to third tier dimension would be 11'-4", to allow for ADA van spaces to be allowed on that level in the event that the ground level was converted to retail. The third tier to fourth tier dimension, fourth to fifth tier dimension, and fifth to sixth tier dimensions would be 10'-8". The sixth tier would have a 4'-0" high parapet wall. The overall height would therefore be 63'-4".

Expansion to the garage would be possible, if the garage was allowed to grow taller than the 60' vertical constraint as set by the Borough of State College, through the addition of more tiers. While horizontal expansion is generally preferred, due to the site constraints, it is unlikely that horizontal expansion would be possible. Enlarging to the east would negatively impact the loading area for the adjacent academic building. Growing to the north would negatively impact the bus turn-around, or encroach onto the golf course. Extending to the west would put the garage onto the residential area property. Adding a bay on the south side would negatively impact the academic quad by completely cutting off any access between the residential area and the academic area, and may constrict the building pad that is anticipated in the Master Plan.

### **RECOMMENDATION**

*The functional layout of the garage must be well thought out to avoid conflicts between vehicular circulation and pedestrian circulation. This efficiency in the design will lead to lower construction costs.*

*The proposed garage must become the “lynch-pin” between the academic quad and residential areas of the campus, with stair towers at the corners of the garage providing good access to all areas of the campus.*

*If it is desired to include the transit station and a cafe, or possibly ground tier retail/office, the garage must become the “third place”, contributing to the pedestrian friendly feel of the academic quad.*

### **3.1.6 Safety and Security**

#### *Passive Measures*

Safety and Security in a garage can be achieved through the design of the physical structure. A good layout will result in long, clear sightlines that allow visibility of all patrons and security officers. Similarly, interior walls should be eliminated if possible, and shear walls should be moved to the exterior, to eliminate “hiding spots”. The location of the ramp can also be considered in the same line of thinking. Stairs and elevators that have large openings or glass to a public area such as a street allow visibility into the stair and elevator by patrons and patrolling police. Lighting can be provided that creates a bright interior environment.

#### *Active Measures*

Technology can play a part in making a garage safer. Installation of closed-circuit television monitoring systems will provide the opportunity to see what is happening in a space, even when the patrolling officer is not there. Location of the cameras becomes important in capturing the field of vision, especially if the cameras are monitored by a human security officer. Emergency call stations are necessary in the event that a patron of the parking garage has a problem, and needs assistance from the security officer or police.

#### *Prevention through Design*

According to the Centers for Disease Control and Prevention, one of the best ways to prevent and control occupational injuries, illnesses, and fatalities is to “design-out” or minimize hazards and risk. The mission of this program is to create a safe workplace for construction workers by controlling risks. This requires anticipation in the design phase to eliminate hazards to workers in facilities, work methods and operations, process, equipment, tools, products, new technologies, and the organization of work. As structural precast (spandrels and double-tees) are produced in a plant, with controlled conditions, many risks are avoided in the construction process just by the selection of the precast concrete structural system over the cast-in-place concrete structural system.

In terms of the user experience, there are other safety aspects that can be incorporated into the design. Stormwater drains will be located away from doors and areas of high pedestrian traffic, so that in the colder seasons, there is less chance of ice accumulating along the major circulation paths, thereby reducing the chance of users slipping and falling. Similarly, a surface coating would likely create a slipping hazard; we would recommend a swirled-broom finish that will create a good traction surface for minimal cost. Lastly, we do not recommend the use of concrete wheel-stops, as those also have been shown to be a tripping hazard.

### Enhanced Fall Protection

Creating a parking garage where users cannot hurt themselves has become a priority at college campuses across the country. Many institutional organizations, such as the Veterans Administration, have even begun to write standards on how to technically prevent such events. The International Parking Institute recently released a document entitled, “Suicide in Parking Facilities: Prevention, Response, and Recovery” to help parking planners, owners, and developers determine how best to create a safe garage and safe operation.

There are several ideas that can and should be investigated in the design of a parking garage that can aid in the prevention of such an event. Screens or fencing can be installed in all openings, especially openings that are on the 4<sup>th</sup> tier or higher, to prevent someone from climbing out of the openings. On the top tier, this fencing should extend to at least 8’-0” above the deck, curve back towards the interior at the top, and be designed to discourage climbing. Landscaping can be planted at the base of the garage to discourage someone from jumping off of the garage. Signage can be placed throughout the garage that gives the phone number of assistance counselors or prevention hotlines. And of course, the human security guard that regularly patrols the garage is one of the best ways to discourage an event, or assist if there is an issue.

### Signage and Wayfinding

Signage in a garage can contribute to the sense of safety not only through prevention of an event, as described above, but also in simple pedestrian navigation. Ease of wayfinding through a garage, enhanced by well-located signs with clear language, can go a long way in enhancing the sense of safety and security.

## **RECOMMENDATION**

*As safety and security are the top priority on a college campus, it is the intent that this garage be very safe and secure. The study team recommends several passive security measures. The layout must provide long, clear sight lines. The interior must be well lit. We recommend landscaping around the base of the garage with nice bushes and small trees. Active measures must be employed as well, such as closed-circuit cameras, and emergency call stations.*

*The precast structural concrete, made in a factory, will make construction safer. The flooring must have adequate traction, created by a swirled-broom finish. There must be no trip hazards such as concrete wheel-stops, nor slip hazards such as surface coatings. Drains must be placed away from the main pedestrian paths, so reduce the chance of icy surfaces in winter. There must be decorative fencing on the ground tier openings to make the openings more secure. Enhanced fall protection in the form of fencing or barriers must be provided at the top tier.*

*Vehicle signage must lead drivers through the garage to parking areas, and back to the exit. Pedestrian signage must keep the walking patrons safe and separated from the vehicle circulation, and inform the patrons of nearby destinations.*

### **3.1.7 Architectural Design**

The architectural style and design of the parking garage is critical in creating a sense of place, a sense of safety, and promotes foot-traffic. The parking garage is the front door to the development; it is the first experience that patrons have of their destination.

The architectural treatment of the parking structure will hint at the flavor for the future development. Plazas and Cafes incorporated into garage design help activate the area surrounding the garage, enhancing the sense of safety and of place.

### Zoning

Local ordinance affects the architecture of the garage in numerous ways, from restricting the height, restricting the mass through yard set-backs, and dictating the size of parking stalls and drive lanes.

### Exterior Enhancement

The options for exterior façade treatments are almost endless. In many cases, garages are considered support buildings to the other development, and therefore are designed with an acknowledgement of the existing architectural language, or very simply, so as to not draw attention away from the main attraction. However, sometimes garages can be the sculptural piece that brings the zing to a development because it has fewer functional restrictions. Designers have to consider the proper material selection, pedestrian scale, and detail.

### Interior Enhancement

More and more, the interior of the garage is becoming an important component in the development of a garage. Considering that an individual's experience of a place starts the moment they step out of their car, the interior of the garage is the front door to the place. This interior environment is shaped by the lighting, including natural light, the signage, and the finishes in the elevator lobby.

### Landscaping

The area around the garage must also reflect the desired tone of the development. If the garage is in a suburban area, landscaping may be desired. If it is in an urban area, the trees that line the streets must be considered.

## **RECOMMENDATION**

*The material and aesthetic of the proposed garage must complement the existing buildings on campus to enhance the sense of place. The façade treatment must be a composition of exposed precast, with embedded thin brick. The thin brick must be of a complimentary color to the surrounding academic buildings. Glass in the stair towers must match the windows in the adjacent academic buildings.*

*The interior of the lobbies are recommended to be inviting and bright. The ceilings must be a linear metal panel system. The flooring must be ceramic tile. Walls must be painted with a series of colors that help to define the floor level, with large graphic numbers indicating the specific tier.*

### **3.1.8 Integrated Uses**

There has been a trend to provide garages that are actually part of a larger development, or garages that have other uses integrated within the garage. These mixed-use types of facilities couple the garage with other uses like a Bookstore, a Fitness Center, a Grocery Store, a Café or Coffee Shop, a Restaurant, part of a Medical Office Building, or even part of a Residential Tower.

These types of mixed-use buildings have the integrated use as either an infill within the garage footprint, a liner building that adjoins the garage, or an overbuild that is built above the garage.

At the proposed garage, there are several types of integrated uses being considered.

A Bus Depot has been discussed as part of the original program. A Bus Depot would accommodate long distance carriers. This level of service would require a waiting room for the patrons, as well as restrooms for the patrons, and a window to purchase tickets. A Bus Depot would also include staff spaces, such as a ticket office, staff toilets, staff breakroom, etc.

A Transit Station however is an improved bus stop. This type of facility would accommodate users of the campus / town bus system CATA. It is anticipated that two to three (2-3) circulator buses would be here at one time. The space needs for this type of operation would be limited to a waiting room.

### **RECOMMENDATION**

*The garage must be flexible in design to accommodate uses such as a cafe and a transit station in the future.*

### **3.1.9 Sustainable Design Strategies**

Incorporating sustainable design strategies in a garage has become commonplace, the industry has even adopted standards for sustainability known as ParkSmart. Concrete has a high percentage of recycled material. Some garages are incorporating rooftop systems such as a greenroof to provide amenity space and control rainwater runoff. Rainwater is also often collected for use on the site by a cistern constructed under the garages. Garages with water use are incorporating water-saving fixtures. Energy use is cut through smart lighting practices, such as using occupancy sensors, timers, or photocell receptors during the day. LED lighting fixtures have become the parking industry standard, offering lower energy consumption, and reduced maintenance as a result of longer life-span. Preferred Parking Options for patrons who carpool are being provided. With many more electric vehicles on the road, many garages are now having Electric Vehicle Charging Stations installed. And for the traveler that is using a bike for local trips around the garage, bike racks are being installed. In a few cases, owners of parking garages are using the top level of the garage as a place to mount an array of solar photovoltaic panels.

### **RECOMMENDATION**

*With multi-modal transportation that is prevalent on a college campus, bike racks must be installed within this proposed garage. LED lights must be on occupancy sensors. Electric vehicle charging stations must be planned for, with electric conduit provided for future installation of the charging stations.*

### **3.1.10 Innovation Opportunities**

Technology has infiltrated and supported every aspect of our lives, and parking is no different. Below are some examples of technology that may be incorporated into this project.

#### Parking Guidance Systems

Due to the size of the garage, it may be advantageous to have a parking guidance system. This system could give an overall picture of whether the garage is “full” or not, and could provide a count of how many spaces are available, including a breakdown by tier. A more robust system could have indicators over each stall to show the vacant spaces.

### Visual Displays / Interactive Digital Concierge

The lobby spaces in a garage provide a good opportunity to present information to the users, such as weather conditions, points of interest, local happenings, or advertisements for local businesses.

### Music

Some garages are using music as another strategy to create a user-friendly environment. In some cases, the music can help with identifying the floor level.

### Mobile Apps

The most pervasive technology in today's society is the mobile phone and associated applications. Parking apps can help a driver identify and navigate to a parking garage and pay the parking fee.

## **RECOMMENDATION**

*With the almost complete adoption of the smart phone, we recommend designing the garage to accommodate the parking guidance systems, and allowing occupancy status to be viewed by a mobile app. If this garage includes a transit station in the future, there will likely be more of this information in the waiting room for the terminal, in the form of digital informational signage. The study team also recommends as a part of the parking equipment package that digital information signage, also known as "digital concierges", be installed in the garage lobbies to give information on local bus schedules, availability of ride-sharing, and other transportation options.*

### **3.1.11 Maintenance and Durability Design**

In order to create a durable parking garage and maintain that structure to get the maximum benefit from the investment, the selection of the structural system must be carefully considered.

There are advantages and disadvantages of cast-in-place post-tensioned concrete structural systems in comparison to a precast prestressed concrete system. Cast-In-Place offers minimal slab joints which equates to lower long-term maintenance costs. The monolithic construction of a cast-in-place system allows for minimal connections to maintain. On the other hand, as the concrete is poured on-site, it is susceptible to weather and sequencing of the work. The initial costs for the cast-in-place system may be higher than a precast system, and the construction duration is generally longer as well.

There are typically three types of maintenance programs for a parking structure – routine, preventative, and replacement maintenance. Routine maintenance occurs daily, monthly, or annually, to ensure the safe operation of the facility, such as power washing the floors, localized maintenance of traffic deck coatings, and regular inspections. Preventative maintenance protects the capital investment by preventing major repairs through annual engineer observations and global replacement of joint sealants, expansion joints, and traffic deck coatings. Replacement maintenance addresses elements and systems that reach the end of their useful life.

There are three categories of items requiring maintenance within the parking garage: operational, structural, and aesthetic. Operational Maintenance items include, but are not limited to: light fixtures, security monitoring equipment, HVAC systems, elevators, and Fire Protection equipment. The Operational Maintenance category also includes Washdown, Winterization, and Snow-Plowing and Ice Control. Structural items, such as the concrete columns and concrete double-tee floor decks, have varying

review periods. Structural Maintenance items include inspection of items such as the Double-Tee Floor System, the Beams and Columns, and the Waterproofing, and these items are typically reviewed annually or as required. Aesthetic Maintenance includes items such as inspection of Landscaping and Painted Surfaces.

The recommended schedule for certain items in the garage is:

- |                                  |  |
|----------------------------------|--|
| 1. Lighting                      | Inspect all fixtures weekly  |
| 2. Security Monitoring Equipment | Test weekly  |
| 3. Mechanical Equipment          | Inspect elevators according to local requirements and manufacturer requirements  |
| 4. HVAC System                   | Air filters should be changed monthly  |
| 5. Fire Protection Equipment     | Periodically check standpipes  |
| 6. Graphics and Floor Striping   | Inspect floor striping semi-annually after cleaning  |
| 7. Sweeping                      | Remove all dirt and debris weekly  |
| 8. Washdown                      | Semi-annual with low-pressure water hoses  |
| 9. Winterization                 | Fire Protection system and hose bib system   |
| 10. Snow Plowing                 | Plow snow downhill; blade shall be modified with a heavy rubber or polyurethane cutting edge. Plan areas to be “dump zones”. DO NOT pile up snow within the garage unless the structure has been designed for the extra loading. |
| 11. Ice Control                  | DO NOT apply deicing chemicals containing chloride directly to the concrete unless extreme ice conditions exist.   |

We understand that it is Penn State’s standard practice to wash down each deck once a year. It is typically recommended to “wash-down” a parking facility in the spring and again in the fall to remove chloride containing salts. We also understand that Penn State has a recurring 5-year major rehabilitation program to help preserve and extend the service life of their existing parking facilities.

### **RECOMMENDATION**

*A maintenance schedule for the parking garage should be created by the engineer of record with maintenance activities such as recommend wash-down periods.*

### **3.1.12 Future Trends**

Many factors have contributed to a new consideration about when to build parking, and how much parking to build. Migration from rural to more urban areas has resulted in more people needing a personally owned vehicle less, as they utilize mass-transit and ride-sharing in greater numbers. The emergence of the autonomous car has led many to believe that the use of these robotic cars will lead to even less personal ownership of cars, as more and more people are simply picked-up and dropped-off.

This new use pattern, if it truly comes to fruition, will require a different kind of built environment from the one we have now. This may result in the ground level of a garage becoming a type of drop-off zone, where drivers get out of the car and allow it to self-park on upper tiers. If cars can park in greater density

within the garage, this may limit the amount of expansion that is required of the garage for future demand. If there is not enough demand to fill the garage, either a portion of the garage may be demolished, or the garage may be demolished entirely. Another strategy that is being considered is to convert the garage to an alternate use, such as a residential building or office building.

These strategies necessary to “future-proof” a parking garage will add initial costs to any parking development. Raising the floor-to-floor levels to accommodate habitable spaces with appropriate lighting and HVAC has a cost. Enhancing the structural capacity of the slab system to upgrade from what is required for parking to what is required for other uses has a cost. Constructing the garage with exterior walls that can manage the thermal changes and the weather conditions is different from typical garage construction, and would have a cost. Providing areas for future vertical chases for HVAC and utilities will require changes to a garage layout, which has a cost. It is difficult to anticipate which costs are necessary, but many in the parking industry are estimating that these strategies could add as much as 25%-30% additional cost to a garage project. Most Owners developing a parking garage are finding it difficult to justify this cost, when the ultimate use is not known. It is for this reason that many parking garage developers have not adopted this “future-proofing” to a significant degree.

### **RECOMMENDATION**

*This garage must be designed to provide parking for 50 years. Many of the future concepts will not be feasible or financially viable for many years, and therefore we don't recommend the additional costs to “future-proof” a garage for an unknown future.*

### **3.1.13 Office of Physical Plant Performance Standards**

#### Design and Construction Standard Section 01 80 00 Performance Requirements

The Performance Standards as set by Pennsylvania State University, and covered in the Design and Construction Standards 01 80 00, address “best practices in an integrated, holistic, balanced way to achieve high-performance facilities that are safe, productive, comfortable, pleasant, and conserve resources such as energy, water and raw materials, and minimize or prevent environmental degradation over their useful life.” By aligning the design of the proposed parking garage with standards such as ParkSmart, which is the sustainable design standard for the parking industry, as well as other industry “best practices”, the proposed garage will meet the expectations of Penn State. Specifically, the site will be optimized by providing the most parking on the available area, and the energy use will be minimized through the use of energy efficient lighting. Parking garages typically have a low impact on the environment due to use of materials with high recycled content. Parking garages typically have low water consumption. Most of the 01 80 00 document refers to attributes of a building with occupied space, which the parking garage will not have.

## **3.2 PARKING GARAGE SPECIFICS**

### **3.2.1 Building Codes and Zoning Ordinances**

- Applicable Codes
  - Pennsylvania Uniform Construction Code (UCC)
  - IBC 2009, IBC 2015 for Chapter 11 and **Appendix E**.

- Zoning Ordinances, Borough of State College, Pennsylvania
- Zoning Ordinance for the Borough of State College, Development Parameters for Faculty, Staff, and Community Student Parking Lots:
  - Size of Stall = 8'-6" wide is minimum, and for a two-way double-loaded drive aisle requires a dimension of 61'-3" for the parking module (nose to nose of the opposing parking stalls including the width of the drive aisle). Stalls that are 9'-0" wide require a marking module of 59'-9".
  - The stripe projection must be a minimum of 16'-6" long.
  - Columns and light poles may protrude into the parking module a combined maximum of 2'-0", as long as they do not affect more than 25% of the stalls in that bay.
  - Compact cars may have a stall with the dimensions of 8'-0" x 15'-0", but may only make up 15% of the total capacity.

### 3.2.2 Parking Demand

- The 1,350 parking spaces noted in the 2006 West Campus Master Plan was based on a previous study of the capacity of the road network
- The garage is currently sized for approximately 1,670 parking spaces based on the largest footprint that can be constructed without an expansion joint, and the recommended number of tiers for a single-helix ramp style.

### 3.2.3 Size of Potential Programmed Spaces

- Cafe = 2,000 SF
  - This is based on information found regarding the typical/average size of an Au Bon Pain shop according the corporate real estate website.
- Transit Station = 1,200 SF to 1,450 SF
  - This is based on a waiting room that is approximately 25' deep by 48' long.
- Office / Retail = Approximately 17,000 SF
  - remaining space in the bay per the exhibits included in the Appendix

\* the number of parking spaces lost in the overall count due to inclusion of these programmed spaces is depicted in Appendix Exhibits A.1 thru A.4.

### 3.2.4 Preferred Structural System

The superstructure (above grade portion) is recommended to be a precast concrete type parking garage. The fabrication of the precast concrete structural pieces, which make up a large portion of the parking garage, occurs in the plant, leading to higher quality of the concrete. Additionally, this plant provides a safer work environment for the laborers. A precast concrete superstructure can be designed, delivered, and erected faster than a cast-in-place concrete superstructure, often due to the environmental conditions at the site (weather). This may mean as much as a two-month shorter construction duration. A precast superstructure is less expensive than a cast-in-place superstructure in initial costs due to the fabrication process, resulting in a savings as much as \$20 per square foot. A precast superstructure does have higher maintenance costs than a cast-in-place superstructure due to the number of joints.

Subsurface conditions will be investigated and analyzed in the design phase. For the purposes of this study, it was assumed that the garage would need a deep foundation system, such as an auger-cast pile system. No further assumptions were made in regards to the soil capacity or existence of contamination.

### **RECOMMENDATION**

*This garage is recommended to be a precast concrete superstructure, supported by a deep foundation system. With proper maintenance, this type of structure can last for 50 years.*

### **3.2.5 Solar Array**

Parking garages offer expansive, unshaded and unobstructed spaces ideal for the installation of photovoltaic collection systems. Rooftop solar systems capture sunlight which is converted to energy. In a parking garage, the photovoltaics would typically be mounted to a support frame above the top tier. These solar cells then send DC power to inverters in the electrical room, which convert the power to AC. The systems typically include monitoring devices as a means of regulating electrical output. Energy can either be stored on site or tied into an electrical utility grid.

The power generated by the systems can be used to power the lights within the garage, or even connect to the electric vehicle charging stations. The frame for the solar collection system and the panels themselves provide other benefits as well, such as creating shade, keeping cars cool in the summer, or protection the users and cars below from hail or snow in the winter.

Costs for a system are not insignificant, slightly more than adding another parking tier to the parking garage. In addition to the cost of the panels and frame, the systems have a weight impact on the garage, and this load must be factored into the structural design. Foundations and superstructure must be designed to support the additional load. However, there are some incentives such as federal tax credits available that can counter the costs. Another aspect of the installation of the solar array is that fact that as the garage top tier is within two (2) feet of the height restriction, the solar array would be in non-compliance.

Because a photovoltaic system is so expensive, another way that parking garage owners can take advantage of this is through a land-lease type of arrangement. The garage owner can simply “rent” the top of the garage to the solar system vendor, who then pays for the system, and provides electricity at a reduced rate back to the garage owner.

### **3.2.6 Utility Load**

A conceptual load was determined for each of the anticipated utilities, in order to share with the local utility providers to determine the impact to the utility network. Loads are estimated. Representatives from Penn State were consulted on each of these utilities, with the following recommendations.

#### Electrical

The design team anticipates a 480/277 volt, 3-phase, 4-wire, 800-amp electrical service is needed for the proposed parking facility. After review, Cyle Vogt, Senior Electrical Engineer with OPP Engineering Services, felt that there was currently enough capacity in the electrical system for the proposed garage.

Additionally, Mr. Vogt stated that emergency power is available, and that no emergency generator should be included in the design for the proposed garage. Also, Mr. Vogt felt that electric vehicle charging should be included, with 21 level two charge stations available on the ground tier, and 42 level one chargers on each level of the upper tiers. This total of 231 electric vehicle chargers would be in excess of the 1% of the total parking count requirement set by ParkSmart, but could be justified in anticipation of the evolution of cars from combustion engine to electric motor. The electric vehicle charging stations would not be installed in the initial construction of the proposed garage, but the rough-in required for future installation would be installed. Mr. Vogt also expected all lighting to be LED type fixtures with daylight harvesting ability, and be network controlled.

#### Natural Gas

Ron Pristach, Steam Systems Engineer with OPP Engineering Services, confirmed that there is natural gas available, but that the line that comes onto West Campus is very small, depending on the size of the need to power a generator. The main gas line, should a tap be needed there, is on Atherton Street. This location is approximately 1,300 linear feet from the proposed parking facility building pad, and would be very costly to run.

However, as noted above, it was determined by Cyle Vogt, that the garage would not need an emergency generator due to the availability of back-up / emergency electrical power on the campus. Due to this, Columbia Gas (local supplier) was not contacted to determine capacity issues, nor the cost to run the gas line to the garage.

#### Water

Based on the location provided by TimHaahs, Jim Baird, Water Systems Engineer with OPP Engineering Services, recognized that there may be conflicts with two (2) water lines on the site. At least one of the two could be avoided with proper location of the garage. Mr. Baird also provided the two most recent flow tests for the area, showing that the static pressure prior to the test ranged from 57 psi to 60 psi dependent upon the fire hydrant tested. Also, the flow-tests showed that the flow during the test ranged from 1,752 gallons per minute to 1,873 gallons per minute, dependent on the hydrant tested. Mr. Baird also felt that due to the relatively small amount of water needs associated with the parking facility, transit station, or retail/office space, that there should be adequate capacity to supply the domestic demands. There were two lines that crossed the eastern edge of the garage that would require relocation: a 16" diameter line and a 12" diameter line.

#### Sanitary Sewer

Based on the description of the proposed garage facility that TimHaahs provided to Dave Swisher, Sanitary Sewer Systems Engineer with OPP Engineering Services, it was believed that the discharge to the sanitary sewer system should be relatively low. As such, Mr. Swisher did not anticipate any capacity issues in the sanitary sewer system from the connection of the proposed parking facility. Any additional development on the West Campus would require an evaluation of the available capacity within the sanitary sewer system. Additionally, it appears from the known locations of existing sewer lines that there are no conflicts between sewer line runs and the parking facility building pad.

### 3.2.7 Green Roofs and Rooftop Amenity Spaces

Also known as vegetated roof covers, green roofs are multi-beneficial components that help mitigate the effects of urbanization on water quality by filtering, absorbing, or detaining rainfall. Green roofs reduce the “heat island” effect caused by large amounts of paved areas that hold heat and cause a rise in temperature of the local environment. A green roof can extend the life expectancy of the roofing system by protecting the system from the ultraviolet damage of the sun. Additionally, they provide an opportunity for an amenity space for the building users, often with small parks or spaces for relaxation.

Green roofs do weigh more than a traditional roofing system, and therefore have a structural impact to a roof. In addition to the weight of the system, a green roof would be required to meet the structural loading requirements of an assembly use, in contrast to the lower structural need of a parking use. As an assembly use, the occupancy of a green roof is higher than that of a parking area, which may require additional means of egress. Also, if a truly public amenity space is provided, additional fall protection measures may be required. These initial costs vary depending on the type of green roof system installed, the types of plants, the type of irrigation system provide, etc., and can range in cost from \$75 per square foot to over \$200 per square foot.

For a parking garage, where the “roof level” is actually the top parking area, a green roof also reduces the overall amount of parking provided. This cost is a yearly reduction in revenue. A green roof could be installed on the roof, but the study team does not recommend this due to the belief that the increased costs both from an initial construction cost standpoint and an operational and maintenance cost are not justified for the small benefit provided.

Green roofs also require some maintenance, to manage the growth of the living material. Just after installation, the growing medium needs to be watered frequently to help the plant material get established. This requires some type of irrigation. Often, once the plant material is established, the growing area needs to be inspected for invasive species, and weeded. These items also have an operational cost impact.

### 3.2.8 Underground Facilities

Underground garages are typically very expensive to construct due to multiple factors, including the cost of excavation and the cost of the retaining wall / basement wall structure. In addition, this type of garage, due to the lack of natural ventilation, will be classified under the code as an enclosed garage, and require a mechanical ventilation system. Due to fire resistance requirements, an enclosed garage is also required to be fully sprinklered, further increasing the cost. Stair towers are also larger and thereby more expensive, as an enclosed garage is required to provide areas of refuge at the stairs, with appropriate two-way communication devices. Option 3 as proposed is designed in such a way that the requirements for natural ventilation have been met, eliminating the need for mechanical ventilation or sprinklers.

Underground parking garages are also typically constructed of cast-in-place concrete, which is generally more expensive and takes longer to construct than a precast concrete structural system. It is generally believed that an underground parking tier may cost as much as 25% more than an on-grade parking tier, and that number increases another 25% for each level below grade. In the case of Option 3, the overall

cost is even more, as there would be a rooftop level constructed that would not provide parking, but rather the athletic fields. In a nutshell, Option 3 provides a garage for parking, then a second structure for athletic fields, and then the athletic fields themselves.

Underground facilities also require extra maintenance. Large load issues, de-icing salt usage, and the general hydrostatic pressure problems that come along with all underground structure, create problems unique to underground parking facilities. Water intrusion must be monitored. Concrete deterioration due to trapped auto emissions is also a common reported failure in underground garages.

While there is an expense associated with the underground garage, it is the most viable solution in some situations due to the costs associated with the purchase of real estate. This is why more underground garages are constructed in dense urban areas where land is scarce.

Refer to Appendix Exhibit A.7 for TimHaahs examples as well as a few specific examples raised by Penn State.

### **RECOMMENDATION**

*As part of this feasibility study, it was determined that an underground garage could be located at the intramural fields site. The garage would require excavation, but that approximately 1,100 parking spaces could be provided on one level, and accommodate the play fields above. With the southern face of the parking facility open to White Course Drive, and an areaway provided at each end, natural ventilation requirements will be met, allowing the garage to be classified as an “open parking structure”, avoiding the need for mechanical ventilation and sprinklers.*

### **3.2.9 PARCS Approach**

The analysis of the appropriate Parking Access and Revenue Control System must begin with an understanding of several aspects of the users and the garage, in addition to an understanding of the available technology. Not only will the number of users have an impact on the types of equipment that should be used, but also the types of users. Additionally, the configuration of the garage may lead the designer to select the most appropriate system of access control.

#### Best Practices

Revenue Control and Access control has evolved over the years due to advances in technology and operation of a parking garage. Below are some generally accepted best practices on access control.

- Cashier booths usually require a wider island between entry/exit drive lanes than a simple card reader and gate. Cashier Booths became less prevalent as Pay On Foot Stations became more popular. There are considerable up-front costs for pay-on-foot equipment, however the payback period is a function of labor cost and benefit savings. The latest developments take advantage of the advances in technology, now providing pay-in-lane, Radio Frequency Identification in a hang-tag (RFID), Automatic Vehicle Identification (AVI), and License Plate Recognition (LPR).
- Off-street queue space should be provided to prevent entering vehicles from congesting streets just outside of garage entrances. Some cities and municipalities require both spaces for queuing prior to entering the garage, as well as space within the garage for queuing prior to exiting the garage.

- If a gate is required, it should be on a fairly level surface to ease the ability of the driver to stop and access the equipment. The grade for the slab in these areas should not exceed 2%.
- Many operators are considering transitioning to pay-by-phone or some other type of web-based payment system.
- The entry experience for a garage patron can be enhanced with systems that show if the garage is “full” or has vacancy. And these systems can also improve the experience and shorten the drive time if they guide the patron to the open spaces.
- Proper and clear signage is important to inform garage patrons of who is allowed to park in the garage, costs for parking in the garage, whether parking passes or permits must be displayed, etc.

#### Understanding Of User Groups & Existing Payment System

Based on conversations with Penn State Transportation Services, we have outlined below our assumptions and understandings related to the West Campus Parking Structure user groups.

- Faculty and staff typically pay by payroll deduction, but some do pay ahead.
- Visitors parking in surface lots currently pay for parking on an hourly basis using Luke II pay-stations. Visitors using a parking garage are paying at the Tiba pay-on-foot machines using cash or credit card, with the option of paying with credit card in the lane. Some visitors do buy a short-term visitor parking permit if they intend to be on campus for more than one day.
- For football and event weekends, depending on arrival time, a user will pay between \$25 - \$35. Other athletic and non-athletic events varying in price from \$5 - \$10, with some lots being free to the patron, paid for by the athletic department based on attendance.

Based on conversations with Penn State’s current parking equipment vendor, Tiba Parking, the operations of the existing parking facilities were described as follows:

- There are ticket-spitters at the vehicle entry.
- There are no cashier stations.
- There are Pay-On-Foot machines for payment; Parking can be paid for by cash or credit card.
- For monthly permits:
  - AVI readers
  - Bar code scanners
- Faculty and staff are monthly permit holders; some students have purchased the permit as well.
- Students are allowed to park in faculty parking garages after 4pm, but must be out by 7am.
- For occupancy, there is a marquee type sign at the front of the parking garages.
- There is a monument sign inside the garage at the ground level only.
- There is a ground loop at the top level.

- Mobile LPR may be an option.

### Garage Configuration

Based on the proposed location of the garage, as well as the reconfiguration of the access roads around West Campus, the configuration of the garage will drive some access control decisions.

- An entry lane with parking equipment will require a lane that is at least 9'-0" wide. The parking equipment would sit on an island that is 3'-0" wide.
- Lanes in line with the travel aisle can be narrower than lanes that require turning into. In other words, the 9'-0" wide lane may be too narrow if a turn is required to enter the garage.
- Entry portals and Exit portals in the garage should be located based on the understood traffic demand. Additionally, the number of entry lanes and the number of exit lanes at the respective portals should be based on understanding of the traffic volumes.
- A garage that is very large or very tall may benefit from a guidance system so that patrons are not searching for empty spaces when none are available on that tier. Guidance signage can inform them to continue to the next tier for open spaces.

### Penn State Special Requirements

Based on conversations with personnel from Penn State Transportation Services, the following special requirements are known:

- Penn State would like Space Occupancy / Level Counting.
- Penn State will examine both a gated and gateless access control option as well as installing similar Tiba equipment as used in the other campus parking structures.
- Penn State is currently using systems provided by Tiba Parking Systems in other parking facilities.
- Penn State is currently investigating new parking guidance systems that incorporate a camera, rather than the ultrasonic type of system. They also like the type of signage and indicators that are provided with some of these newer systems.

### **RECOMMENDATION**

Based on the understanding of the attributes of the users and of the garage, we make the following recommendations in regard to access and revenue control:

- The proposed site locates the garage with close proximity to the intersection of North Atherton Street and White Course Drive. A new access road from West College Avenue is anticipated. There will be two Entry/Exit points, serving White Course Drive.
- According to the information gathered as part of this study, approximately 64% of users will be coming from the east – North Atherton Street side. The remaining 36% will be coming from the west – West College Avenue side. To accommodate the volume, the side serving the west load will have a dedicated entry lane, and a dedicated exit lane. To accommodate the volume approaching from the east, this portal will include a dedicated entry lane, a dedicated exit lane, and a center reversible lane.
- The garage will primarily be used by faculty and staff. These users will occupy approximately 80% of the parking spaces. The garage will also provide parking for

visitors, occupying approximately 20% of the total parking count. Based on this information, providing short term parking on the lowest tier is recommended, with staff parking on the upper tiers. Traffic would be restricted from ascending the ramps to faculty/staff parking by way of gates and a system employing license plate recognition.

- The parking garage will also be used for event parking, and most events occur in the evening. Gates would remain in the up position during free events. Rates would be dynamic, changing depending on the event type.
- A bus depot may be located within the ground level of the parking garage. As most bus riders do not currently drive to the bus station, it is not anticipated that there will be any dedicated spaces for bus riders, which would typically require long-term parking. Penn State does not desire to provide long-term parking within the garage.
- A cafe and flexible office/retail areas may be located within the ground level of the parking garage. The garage is not providing dedicated parking for the café or office/retail establishments.
- Because the garage is large, and has 5 supported tiers, a parking guidance system is recommended to reduce the amount of vehicle traffic internal to the garage. Patrons would be informed of where open spaces were located, or would proceed to the next tier.

### 3.3 ANALYSIS OF DEVELOPED CONCEPTS

The design team developed four (4) concepts for the proposed parking facility. The site location identified above was the location of Concepts 1 and 2, with the Concept 3 being proposed at the current Campus Recreation artificial turf play fields (rugby and lacrosse), and Concept 4 proposed at the surface lot to the south of the play field.

#### 3.3.1 Concept 1

Refer to Appendix Exhibits A1.1 – A1.5.

##### Pros

- Overall layout of the garage fits within the arrangement of the adjacent academic buildings and proposed academic buildings better than Concept 2, with less impact to the remaining green space in the center of the quad, and therefore retains a better visual connection between the academic and residential portions of the campus.
- Separation of traffic from the west and the east is better than Concept 2 because it is further separated by the length of the garage. This provides a higher level of service internally to the garage in terms of traffic management of the two entry/exit portals.
- Due to the “east-west” orientation of the garage, there is more room with Concept 1 for the bus turn-around area to the north.
- The location of the garage in the overall campus layout allows the garage to be the “destination”, thereby bifurcating White Course Drive and eliminating the possibility of drivers short-cutting through campus.

- The combined attributes of an efficient layout and the fact that the parking facility is above ground results in this option being virtually the same initial cost as Concept 2, and much less expensive than Concept 3, as reflected in the appendix exhibits.

#### Cons

- Due to topography, the proposed parking garage will be on the highest point relative to the surrounding grade, which will require some grading to level the site.
- Due to the site constraints, there are limited expansion opportunities.
- Due to construction of the proposed parking garage on an existing surface parking lot, there will be a period when the overall parking supply is reduced before it goes back up again.
- Due to the configuration and layout, the existing loading dock at the Earth & Engineering Building will be impacted requiring a new layout for the loading dock. The layout of this concept reduces the distance between the garage and building, with only approximately 53'-0" of clear area provided. This distance has been tested for the maneuverability of an SU-30 "box truck", and it was determined that the truck cannot back into the roll-up delivery doors. If the truck were to simply pull in, and items delivered and then dollied in, then the impact of the garage is minimal. If a larger distance is desired, the garage could be shortened by one 48'-0" wide column spacing. This would result in a loss of 230 parking spaces from the total count for a reduced count of 1,440, and a reduction in cost of approximately \$5 million dollars for a cost of approximately \$38 million dollars. (refer to exhibits in the appendix).
- Expansion will be limited due to the proximity of the adjacent academic buildings and residential buildings.

### 3.3.2 Concept 2

Refer to Appendix Exhibits A2.1 – A2.5.

#### Pros

- The location of the garage in the overall campus layout allows the garage to be the "destination", thereby bifurcating White Course Drive and eliminating the possibility of drivers short-cutting through campus.
- Because the configuration is different than Concept 1, there is little to no impact on the operation of the loading dock for the Engineering Sciences Building.
- The combined attributes of an efficient layout and the fact that the parking facility is above ground results in this option being virtually the same initial cost as Concept 1, and much less expensive than Concept 3, as reflected in the appendix exhibits

#### Cons

- Due to the orientation of the garage, the bus turn-around area is relegated to either the east side or the west side. The east side scenario negatively impacts the academic quad, and the west side scenario negatively impacts the residential area.

- Due to the configuration and layout, the visual connection between the academic and residential portions of the campus, as well as the pedestrian connections by sidewalks, will be significantly impacted.
- The orientation of the garage results in a shorter distance between the separated entry/exit portals, which will lead to more internal traffic issues.
- Due to topography, the proposed parking facility will be on the highest point relative to the surrounding grade, which will require some grading to level the site.
- Due to construction of the proposed parking facility on an existing surface parking lot, there will be a period when the overall parking supply is reduced before it goes back up again.
- Expansion will be limited due to the proximity of the adjacent academic and residential buildings.

### 3.3.3 Concept 3

Refer to Appendix Exhibits A3.1 – A3.6.

#### Pros

- Because this garage is not built on a existing functioning surface parking lot, there will not be any period of reduced parking supply.
- All parking in this option is on one (1) level. No ramps creates a clear line of sight for all parking stalls to egress points.
- This parking facility, utilizing the space under the intramural playing fields, does not occupy a potential building pad on the academic portion of the campus.
- Due to the location of this parking facility to the north of the relocated White Course drive, the interior of the academic and residential campus will be virtually “pedestrian-only / automobile-free”.

#### Cons

- Separation of traffic from the west and the east can be accomplished, but not as well as Concept 1 or Concept 2, due to the proximity of this garage to the Atherton / White Course Drive intersection.
- Due to the site constraints, there are limited expansion opportunities.
- Due to construction of the proposed parking facility as an underground structure with and artificial turf field above, the construction cost will be significantly higher than Concept 1 or Concept 2, as reflected on the appendix exhibits. Maintenance costs for an underground structure are also higher than an above-grade structure.
- There will be no solar array, and thereby no sustainable power generated.

### 3.3.4 Concept 4

Refer to Appendix Exhibits A4.1 – A4.4.

### Pros

- Overall layout of the garage fits within the arrangement of the adjacent academic buildings and proposed academic buildings better than Concept 1, with no impact to the remaining green space in the center of the quad, and therefore retains a better visual connection between the academic and residential portions of the campus.
- Separation of traffic from the west and the east is better than Concept 2 because it is further separated by the length of the garage. This provides a higher level of service internally to the garage in terms of traffic management of the two entry/exit portals.
- Due to the “east-west” orientation of the garage, the location of the bus turn-around area would be completely separate from this garage.
- The location of the garage in the overall campus layout allows the garage to be the “destination”, thereby bifurcating White Course Drive and eliminating the possibility of drivers short-cutting through campus. A separate “emergency vehicle and campus circulator bus lane” would be provided.
- The combined attributes of an efficient layout and the fact that the parking facility is above ground results in this option being virtually the same initial cost as Concept 1 or 2, and much less expensive than Concept 3, as reflected in the appendix exhibits.

### Cons

- Due to the length of the garage, an expansion joint will need to be incorporated into the design. Expansion joints add cost to a project, not only from an initial cost standpoint, but also in terms of life-cycle maintenance.
- Due to restrictions to the length of the garage, in order to accommodate the location of the roadway network to the north and west, the garage cannot be as long as required to match the 1,670 provided by other concepts.
- Due to topography, the proposed parking facility will be on the highest point relative to the surrounding grade, which will require some grading to level the site.
- Due to the site constraints, including the roadway layout and the anticipated building construction, there are limited expansion opportunities.
- Due to construction of the proposed parking facility on an existing surface parking lot, there will be a period when the overall existing parking supply is reduced before it goes back up again.
- Need to complete temporary road connection to Red A lots prior to impacting existing access.

### **3.3.5 Recommended Concept**

After analysis of the developed options, the study team recommends that Concept 1 or Concept 4 be accepted by the University, as these two concepts achieve the goals of the proposed study, with the least negative impacts. Refer to Appendix Exhibits A4.1 – A4.4.

## 4. SITE & ROADWAY CONNECTIONS CONSIDERATIONS

### 4.1 SITE & ROADWAY CONNECTIONS

The proposed location of the garage, and the provision of additional building pads for new academic buildings as noted on the 2006 West Campus Master Plan, requires realignment of White Course Drive and improvements to the intersection at North Atherton Street. In addition, a new roadway connection to West College Avenue is recommended to accommodate the anticipated increase in traffic volume generated by the expansion of parking on West Campus and to offer a second ingress/egress to and from West Campus. The second access is necessary to support the size of the parking structure proposed in this document. As described later in Section 4, various connection options were developed and evaluated.

The option connecting at Buckhout Street was selected as the preferred option based on consideration of overall project cost, right-of-way needs, stormwater management, traffic operations, pedestrian and bicycle network building opportunities, and input from municipal and agency stakeholders. The new connection provides a southern/western entrance to West Campus through the former OW Houts Property (owned by the University). Pedestrians and bicycles will be accommodated via new sidewalk and bike facilities from West College Avenue to West Campus. The project will trigger renovation of the West Campus Stormwater Management Basin, which will be upgraded to manage stormwater runoff for the current and proposed future buildout of West Campus as currently shown on the Master Plan documents. The general connections noted above and presented in detail below – via White Course Drive to Atherton Street and a new connection to West College Avenue via Buckhout Street – are appropriate for any of the garage concepts discussed in Section 3. Based on the selected alternative, variations to the internal West Campus circulation/operations are feasible within the Master Plan building locations/arrangement.

### 4.2 PEDESTRIAN AND VEHICULAR ACCESS AND PARKING

The parking garage will be accessed from two directions with two separate entrance and exit points to the garage as noted above. Access from the north and east will be via North Atherton Street to an extended and realigned White Course Drive. Access from the south and west will be primarily from the new connector roadway. The recommended connection from West College Avenue is at Buckhout Street as shown in **Figure 3** below. A full discussion of the traffic considerations is included below under “Special Site Considerations.” **Figure 3** depicts the garage location from Garage Concept 1. Please note, the roadway horizontal and vertical alignments were developed and utilized to determine cut/fill and impacts. The area immediately adjacent to the garage and bus turnaround have remained conceptual and open to interpretation until final design has begun. As such, the line color for these areas is notably different from the rest of the graphic as these were provided by the Structure Designer.

The other recommended garage location - Garage Concept 4 – would locate the garage closer to White Course drive and utilize the general footprint of the existing Red A Golf parking lot. As much of the

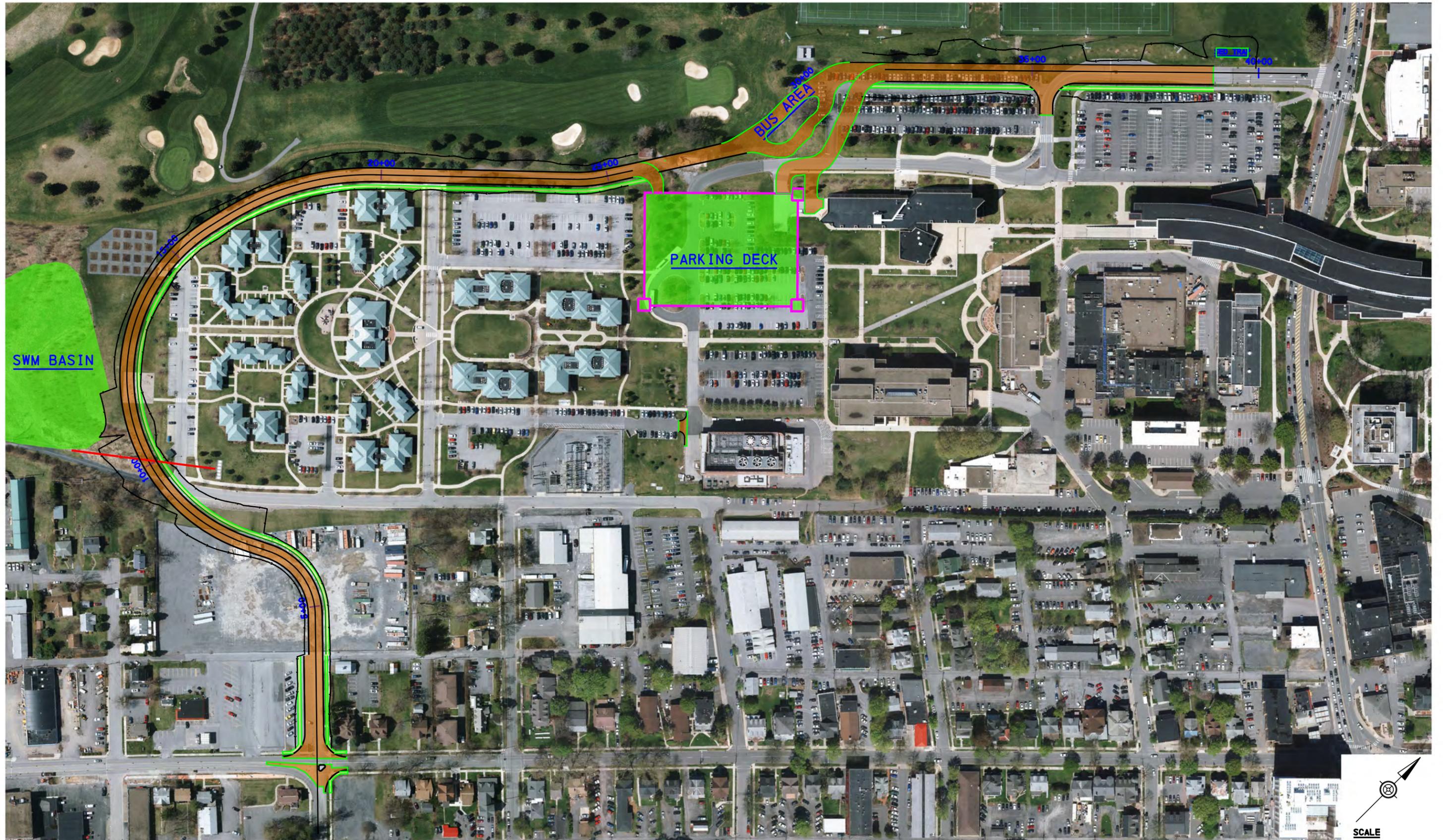
detailed roadway design developed for Garage Concept 1 is applicable for Garage Concept 4, a complete and separate horizontal and vertical roadway alignment was not developed. The location is feasible, but will require the relocation of White Course Drive in advance of the groundbreaking for the structure. A discussion related to operations, permitting, and the schedule for the garage options are included in those sections below.

For the garage locations considered, the roadway will be designed at a 25-mph design speed with the typical campus cross-section utilizing two 11-foot lanes, 4-foot shoulders, a 7' buffer area and a 7' sidewalk on the eastern/southern side of the roadway. The horizontal curve radii will use a 150-foot minimum criterion which is consistent and appropriate for the design speed. The maximum vertical grade along the connector roadway is 5%. At the intersection of College Avenue and Buckhout Street, two separate layouts are feasible and are shown in **Figure 4** below:

- Option 1 is a new signal which would include an eastbound left turn and right turn lane (due to the one-way pair crossover) on West College Avenue, a westbound through-right turn lane and left turn lane on West College Avenue, and a southbound through lane and right turn lane and a northbound through lane from the new Connector Roadway. The existing concrete island on West College Avenue will be removed and replaced by a small island for westbound traffic. Pedestrian accommodations will be provided on all approaches; however, the ideal pedestrian corridor will be on the eastern side of the intersection.
- Option 2 is a roundabout. Due to the size of the turning radii, right-of-way will be required from the property on the southwest corner of the intersection. Traffic operations of the roundabout are simplified due to the termination of the one-way pair, and single-lane approaches would be provided. The ideal pedestrian corridor will be along the eastern side of the intersection where only a single traffic lane is crossed.

PENN STATE UNIVERSITY  
WEST CAMPUS PARKING STRUCTURE AND ROADWAY CONNECTIONS

MARCH 21, 2018  
FIGURE 3. ROADWAY CONNECTIONS



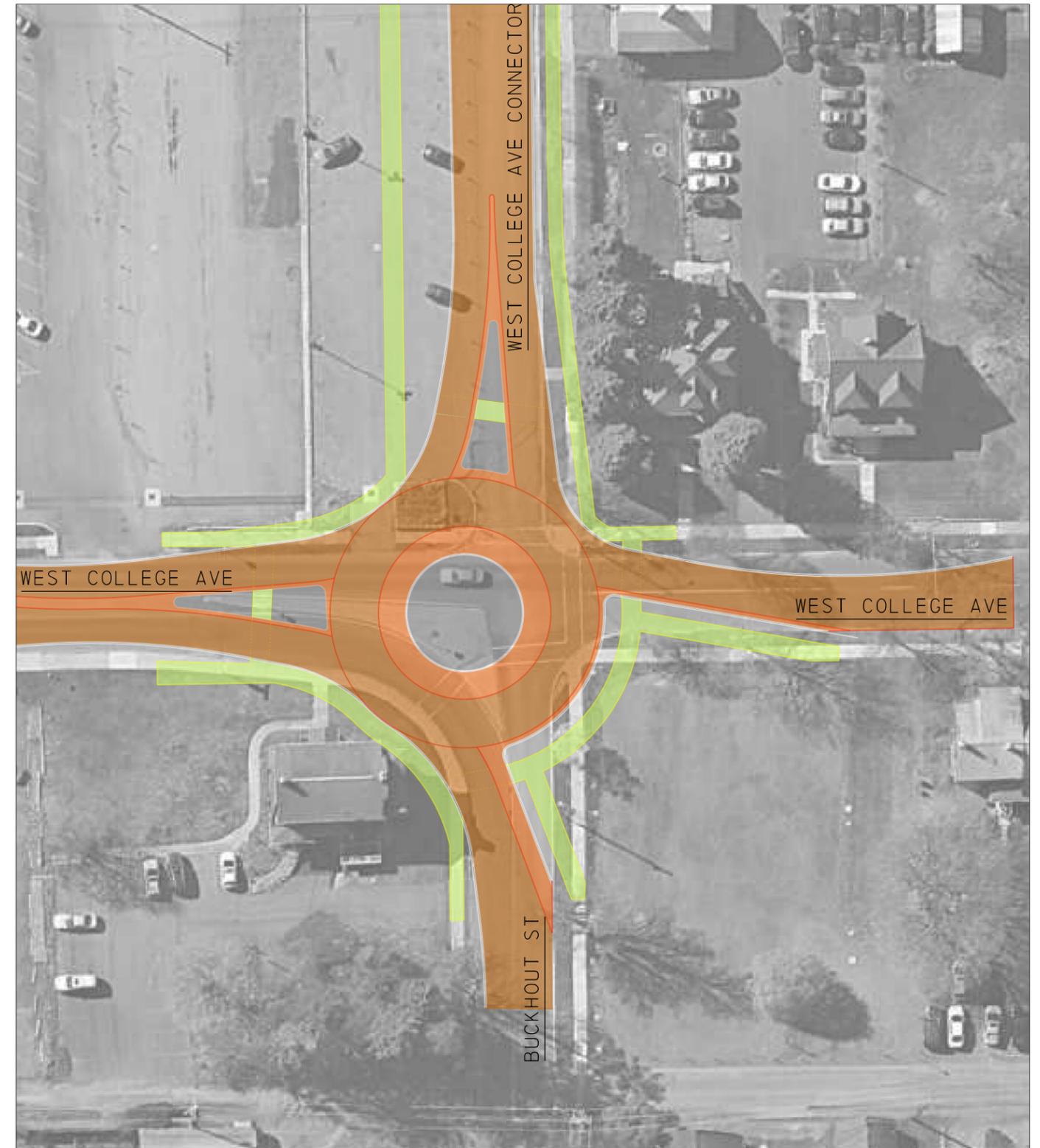
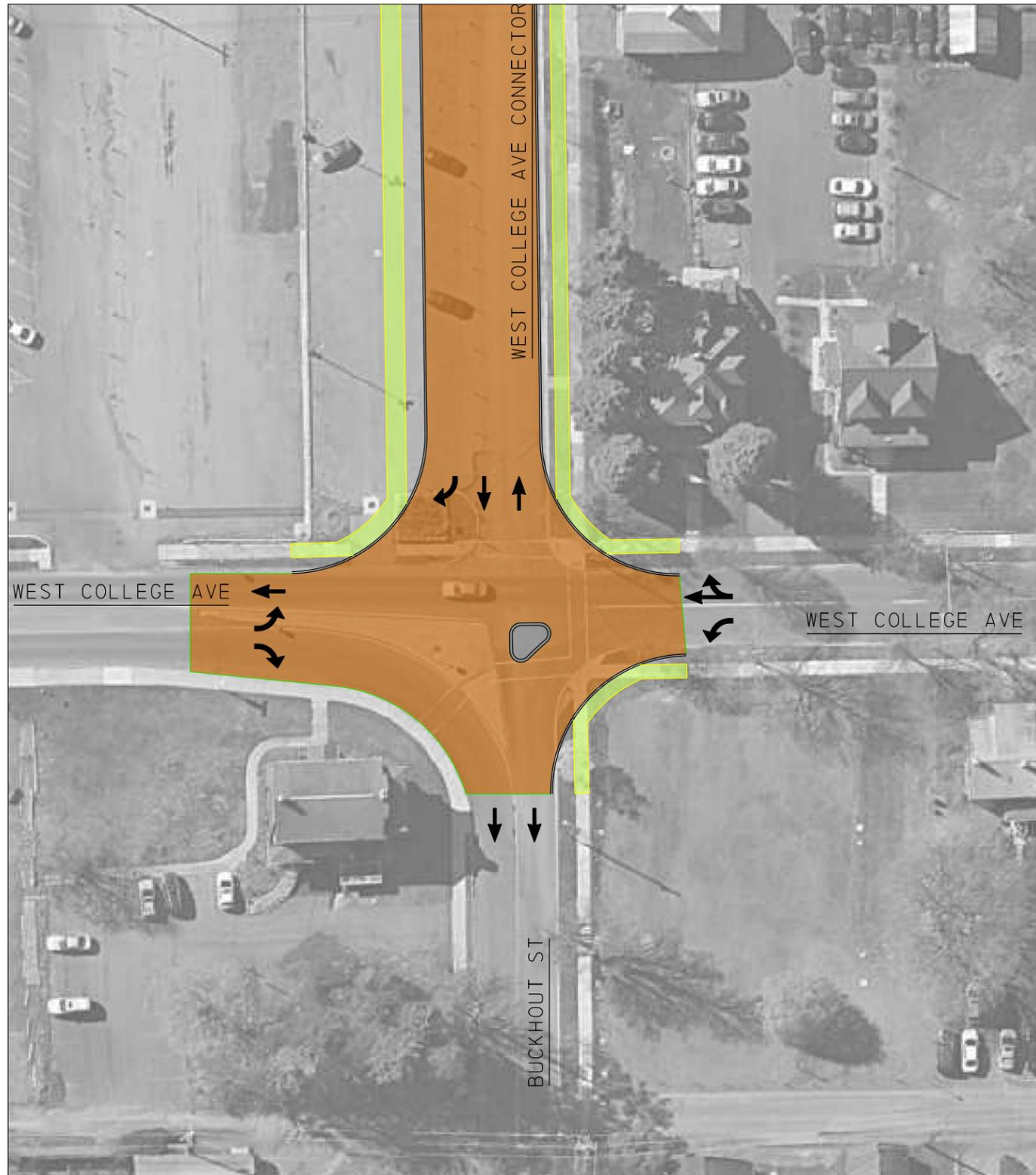
SCALE  
0 100 200 FEET

JANUARY 26, 2018

INTERSECTION DESIGN  
NEW TRAFFIC SIGNAL REQUIRED

FIGURE 4. INTERSECTION OPTIONS

CONCEPTUAL ROUNDABOUT DESIGN  
SINGLE-LANE ROUNDABOUT, 100' DIAMETER



## 4.3 ZONING AND PERMITTING

Both local and state land use regulations and permitting apply to this project. Applicable zoning and subdivision & land development approvals are discussed in the Structure Section as they relate to the parking structure itself.

The overall project area is illustrated in **Figure 7** and in **Appendix C.2** (Exhibit C.2.2). The proposed West Campus Parking Garage and all the White Course Drive improvements are in the Borough of State College and Ferguson Township. The West Campus Basin outfall and stormwater reuse pump system are in Ferguson Township. Therefore, land development approvals and zoning permits will be required from both municipalities. These approval processes include compliance with local stormwater management requirements. A state NPDES permit for construction activities will also be required since the project will exceed the 1-acre disturbed area threshold for these permits. This permit requires compliance with state stormwater management and sedimentation and erosion control requirements. State and local stormwater regulations are summarized in **Appendix C.1**.

As indicated above, local and state regulations and permitting process apply to this project. A summary of these regulations follows:

- Zoning and Subdivision & Land Development (local/municipal)—The applicable zoning approvals are discussed in the Structure Section as they relate to the structure. The parking structure itself is located in State College Borough, which will likely take the lead role in land development plan reviews. Portions of the new roadway connections will be built on parcels that straddle the municipal boundary with Ferguson Township. The Township’s involvement in land development reviews should be clarified going forward, so that the applicable ordinances are known prior to preparing land development plans. The municipal ordinances for both State College Borough and Ferguson Township provide for the preparation of a Traffic Impact Study (TIS) to accompany the land development plan. Under the PA Municipalities Planning Code (MPC), the municipalities can require traffic mitigation on roadways and intersections immediately adjacent to the site as a condition of land development approval. The municipalities can also require the University to obtain all necessary state highway occupancy permits as a condition of plan approval.
- Highway Occupancy Permitting (state) – PennDOT’s Highway Occupancy Permit (HOP) process documents new and revised access to the state roadways system, as well as any construction work within the state-owned right-of-way. Penn State is a registered PennDOT Business Partner and can apply for HOP permits electronically through their Electronic Permitting System. As part of the HOP process, PennDOT will require the University to submit a Traffic Impact Study (TIS). To ensure that the TIS prepared for PennDOT also satisfies the municipal requirements, a TIS scoping meeting is typically coordinated to include municipal, state, and regional officials. Ultimately, both of the local municipalities (State College Borough and Ferguson Township) as well as PennDOT District 2-0 will need to approve the TIS, including any roadway and intersection projects needed to mitigate traffic impacts associated with the new parking garage. The PennDOT HOP process continues with the submission of roadway and intersection plans, for

locations where state-owned roadways are accessed and traffic impact mitigation projects are proposed.

- Labor & Industry Building Permit (state) – Pennsylvania's Uniform Construction Code (UCC) regulations require the Department of Labor and Industry approve **all state-owned buildings and structures**.

For all projects within its jurisdiction, Department staff review and approve plans submissions, issue building permits, perform all inspections necessary to demonstrate compliance with the UCC technical standards and issue certificates of occupancy. Construction projects must meet the requirements of 34 PA Code Chapters 401-405 and the technical standards of the international codes referenced in this regulation.

- NPDES permits for stormwater management and erosion and sedimentation control will apply, as will local stormwater management regulations. These will be summarized in the Stormwater Management section. In addition, state and local stormwater regulations are summarized in **Appendix C.1**.

#### 4.4 SITE UTILITY REQUIREMENTS

Utility requirements for the parking structure are discussed in the Parking Structure section above. Utility impacts and/or needs for stormwater management, including reuse, will be discussed in the stormwater section below.

Within the overall project site, relocation of the existing overhead utility lines near the former railroad bed is included to offer clear sight lines and unobstructed views of West Campus offering aesthetic benefits via this new campus gateway corridor. There are two 46kV circuits and one 12kV circuit located in this area.

#### 4.5 SPECIAL SITE CONSIDERATIONS

##### 4.5.1 Traffic Characteristics of the Parking Garage

###### *Trip Generation*

West Campus vehicular traffic is associated with the parking facilities located there. Using the Institute of Transportation Engineers (ITE) trip generation methodologies, a trip-making “rate per space” for the existing parking lots was developed from the existing parking space inventory and traffic counts taken at the White Course Drive/North Atherton Street intersection.

The total inventory of parking spaces in the Red A lots with access via White Course Drive is 823 spaces, encompassing 770 regular, 11 motorcycle, 29 ADA, 2 reserved, and 11 service spaces. The parking space inventory was verified in December 2017 and provided by Penn State Transportation Services.

Traffic turning movement counts at the White Course Drive/North Atherton Street intersection were conducted on November 8, 2017 during the weekday morning commuter peak (7:00 AM to 9:00 AM) and the weekday afternoon commuter peak (4:00 PM to 6:00 PM). These are the most intensive traffic volume points in the day, since the peak volumes entering and existing West Campus will overlap with the North

Atherton Street traffic peaks. Traffic design that satisfies these peak points with acceptable levels-of-service meets the municipal and agency approval standards required in a traffic impact study.

**Table 1** summarizes the peak hour traffic entering and exiting White Course Drive, the number of parking spaces, and the calculated traffic generation rate, in terms of vehicle-trips per parking space.

**Table 1. Peak Hour Traffic Counts & Traffic Generation Rates**

|                     | <b>Entering Trips</b> | <b>Exiting Trips</b> | <b>Total Trips</b> | <b>Spaces</b> | <b>Trip Rate Per Space</b> |
|---------------------|-----------------------|----------------------|--------------------|---------------|----------------------------|
| <b>AM Peak Hour</b> | 340<br>(93%)          | 26<br>(7%)           | 366                | 823           | 0.444714                   |
| <b>PM Peak Hour</b> | 129<br>(28%)          | 324<br>(72%)         | 453                |               | 0.550425                   |

The “trip rate per space” relationship is then applied to generate future traffic associated with the planned parking garage, assuming consistency with the following assumptions:

- The mix of parking space “types” in the garage will be reasonably similar to the current mix.
- The usage of parking space in the garage (i.e., occupancy) will be reasonably similar to the current usage, which is near 100% on weekdays.
- The trip-rate relationship based on current data is sufficiently stable within the forecasting horizon to provide a planning estimate for the purposes of traffic system analysis.
- The proportion of entering and exiting trips in the garage will be reasonably similar to the current proportions.

**Table 2** summarized the peak hour trip generation for the largest possible proposed West Campus Parking Garage – 1670 parking spaces. This planning value is considered appropriate for use in this feasibility level analysis because it is the “upper limit” of spaces that could be built within the parking structure envelope for either Garage Concept 1 or Garage Concept 4, as proposed in this program statement. This number of spaces assumes that the entire garage is used for parking, and no space is allocated to other uses (i.e., no bus depot, ground level-commercial, etc.).

**Table 2. Traffic Forecast for 1,670-space West Campus Parking Garage**

|                     | <b>Parking</b> | <b>Rate Per Space</b> | <b>Total Trips</b> | <b>Entering Trips</b> | <b>Exiting Trips</b> |
|---------------------|----------------|-----------------------|--------------------|-----------------------|----------------------|
| <b>AM Peak Hour</b> | 1,670 spaces   | 0.444714              | 743                | 690<br>(93%)          | 53<br>(7%)           |
| <b>PM Peak Hour</b> |                | 0.550425              | 920                | 262<br>(28%)          | 658<br>(72%)         |

A traffic design associated with the upper limit would provide confidence that the traffic for a lesser number of parking spaces would also be accommodated on the street system at the same or better level of service. Municipal and DOT agencies routinely accept an analysis of the upper limit, capacity, or worst-case where exact development values are unknown at the start of the study.

### Traffic Distribution & Assignment

With a new roadway connection to West College Avenue, future traffic will have two options for accessing the West Campus Parking Garage. To estimate the distribution of traffic between the two, a “traffic shed” type of analysis was completed using home-address matched parking permit data. The parking permit sample included those assigned to Red, Green, and Brown permits that could eventually be consolidated into the West Campus Parking Garage.

The home address-points of 1,506 permit holders were mapped in GIS, and traffic sheds were drawn to identify groups of permit holders that would likely use a similar route to reach the West Campus Parking Garage. Results of the Traffic Shed Analysis revealed the following proportions of traffic at the two primary access points:

- 64% to/from White Course Drive
  - 43% to/from the north via North Atherton Street
  - 21% to/from the south via North Atherton Street
- 36% to/from the New Connection to West College Avenue
  - 29% to/from the west via West College Avenue
  - 7% to/from the east via West College Avenue

### Traffic Forecasting

To account for regional traffic growth that is expected on North Atherton Street and West College Avenue, existing traffic volumes were increased by 0.78% per year (compounded) according to PennDOT’s Traffic Growth Factors for Non-Interstate Roadways in Centre County. Growth was projected for 8 years, from the count year (2017) to the project planning horizon year (2025).

All traffic accessing the White Course Apartments was re-assigned to the roadway network assuming that access to the apartments would be via the new West College Avenue Connection Option roadway — not on Sparks Street and Patterson Street, as in the current condition. This may be viewed as a “worst-case” assumption.

## **4.5.2 Future Roadway Connection Options**

The University Park Master Plan envisions new vehicular roadway connections extending from West Campus to the southeast. Previous feasibility studies evaluated roadway alignments and connection combinations to Blue Course Drive and West College Avenue.

Since 2008, the University’s land development and other planning goals for West Campus have changed. The prospective Ice Arena and Child Care Center projects were developed elsewhere, and there are no near-term development plans for parcels adjacent to Blue Course Drive and College Avenue. Consequently, the roadway connection from West Campus to Blue Course Drive (while still feasible) is no longer a priority. The University has also purchased additional property along the West College Avenue corridor, which has opened new possibilities for a roadway connection.

Finally, the ongoing planning efforts of State College Borough (West End) and Ferguson Township (Terraced Streetscape District) have broadened the range of transportation design options under consideration. A Municipal and Agency Coordination Meeting was held on December 13, 2017 to vet the

roadway connection options and gain staff-level input on their preferences. A summary of that meeting is found in **Appendix B.4**.

The current feasibility study combines suitable ideas from previous studies with new and evolving opportunities for the West Campus transportation system. The framework of considered options is summarized in **Figure 5** below. The following West Campus Access Principles are applicable to all garage location options considered in Section 3:

- Maintain access to North Atherton Street via White Course Drive in all options.
- Develop a new vehicular access driveway to West College Avenue.
- Divide vehicular access at the West Campus Parking Garage, to restrict “pass-through” movement for personal vehicles between North Atherton Street and West College Avenue.
- Retain the option for a “transit and emergency service-only” link from North Atherton Street to West College Avenue to allow bus circulation and emergency vehicle access across West Campus.



White Course Drive Realignment

The White Course Drive connection to North Atherton Street at the current traffic signal will remain unchanged. However, the chicaning alignment of White Course Drive itself will be straightened to better accommodate the Master Plan building sites (**Figure 5**, red dashed line). The realignment also enlarges the non-motorized core of West Campus and will simplify driveway traffic flow.

West Campus Circulation Route

The feasibility study considered two (2) options for traffic circulation around the existing West Campus (**Figure 5**, dark blue and light blue dashed lines). A comparison of pros and cons of the two routes are given in **Table 3**. The Northern Route (light blue) is the University’s preferred circulation route. Staff from the State College Borough and Ferguson Township were also supportive of this option.

**Table 3. Comparison of West Campus Circulation Routes**

|             | <b>Northern Route<br/>(light blue)</b>   | <b>Southern Route<br/>(dark blue)</b>   |
|-------------|--|---|
| <b>Pros</b> | <ul style="list-style-type: none"> <li>+ Puts vehicular traffic on periphery of the developed West Campus core</li> <li>+ Maintains continuity of the pedestrian-centered West Campus environment</li> <li>+ Utilizes existing roadway corridors</li> </ul>            | <ul style="list-style-type: none"> <li>+ Utilizes existing roadway corridors</li> <li>+ Slightly shorter route to parking garage site</li> </ul>  |
| <b>Cons</b> | <ul style="list-style-type: none"> <li>- Slightly longer route to parking garage site</li> <li>- May impact high-cost electrical utility features</li> <li>- May divide housing from playground and garden plots</li> <li>- Impacts up to 65 parking spaces</li> </ul> | <ul style="list-style-type: none"> <li>- Conflicts with Master Plan building site</li> <li>- Interrupts continuity of the pedestrian-centered West Campus core</li> <li>- Roadway traverses underground features next to Chiller Building</li> <li>- Grade difference north of West Campus Drive complicates roadway design, increases costs, and impacts Borough properties</li> <li>- Puts vehicular traffic closer to Borough residential areas</li> </ul> |

West College Avenue Connection Options

The feasibility study considered four (4) roadway connection options to West College Avenue, as illustrated in **Figure 5**. A description of these alternatives is included below:

**The Corl Street Connection (Figure 1**, gray solid line) is a mostly new roadway that extends westward from West Campus Drive along the Blue Course Bikeway. It turns to follow the edge of the current stormwater recharge area south of the bikeway, to the existing intersection of Corl Street at West College Avenue. The existing skew between the northbound and southbound Corl Street approaches would be eliminated, and the new connection would align with the opposing Corl Street approach.

*The Osmond Street Connection* (Figure 1, pink solid line) is a mostly new roadway that extends westward from West Campus Drive along the Blue Course Bikeway. It turns to follow the edge of the current stormwater recharge area south of the bikeway, to the existing intersection of Osmond Street at West College Avenue. The new connection would form a new 4-way intersection.

*The Butz Street Connection* (Figure 1, green solid line) extends westward from West Campus Drive but turns onto the Butz Street alignment before reaching the Blue Course Bikeway. A short new section of roadway would connect to the existing portion of Butz Street, which connects to West College Avenue at an existing 4-way intersection.

*The Buckhout Street Connection* (Figure 1, yellow solid line) extends southward from West Campus Drive near its western endpoint. It chicanes eastward across the former O.W. Houts site to align with Buckhout Street at an existing 4-way, channelized intersection with West College Avenue. Buckhout Street is the southwestern cross-over link for the College Avenue/Beaver Avenue one-way pair. With the new connection, the existing 4-way intersection would be reconfigured to accommodate all the needed traffic movements.

### 4.5.3 Traffic Analysis

#### Evaluation of Traffic Control Options

With the forecasting traffic, an evaluation of criteria in the Manual on Uniform Traffic Control Devices (MUTCD) indicated that a traffic signal would be warranted at each of the West College Avenue Connection Option intersections. The Corl Street/West College Avenue intersection has an existing traffic signal, but the other intersections would be new installations. To comply with PennDOT policy, the opportunity for installing a roundabout (in lieu or in replacement of an existing signal) was also investigated.

- White Course Drive/North Atherton Street – A traffic signal is currently installed at this intersection. The traffic volume on Atherton Street is outside of the range where a roundabout would be efficient. No change in traffic control is recommended for the existing signalized Atherton Street/White Course Drive intersection.  
*Roundabout not recommended for further consideration.*
- West College Avenue at Corl Street – A traffic signal is currently installed at this intersection. The traffic volumes are near the threshold where a roundabout may be efficient. While spatial constraints do not preclude the installation of a roundabout, impacts to multiple adjacent properties not currently owned by the University would be substantial and may require taking the structure on the southwest corner. Ferguson Township staff have expressed interest in converting the intersection to a roundabout.  
*Roundabout is recommended for further consideration.*
- West College Avenue at Osmond Street -- The traffic volumes are within the range where a roundabout may be efficient, but spatial constraints may preclude the installation of a roundabout. Two residential structures on the north side of West College Avenue (owned by the University) would be impacted and may require demolition.

*Roundabout not recommended for further consideration.*

- West College Avenue at Butz Street – The traffic volumes are within the range where a roundabout may be efficient, but spatial constraints preclude the installation of a roundabout. Multiple strip right-of-way takes and a full take of an existing business (Clinefelter’s Flooring) would be required to accommodate the roundabout footprint.

*Roundabout not recommended for further consideration.*

- West College at Buckhout Street – The traffic volumes are within the range where a roundabout may be efficient, and spatial constraints do not preclude the installation of a roundabout. A single strip take of right-of-way would be required on the southwest corner of the intersection. The University owns sufficient property on the northwest corner (former O.W. Houts site) and southeast corner (gravel parking area) to accommodate the roundabout footprint.

*Roundabout recommended for further consideration.*

See the following “Capacity/Level-of-Service Analysis” section for a more detailed operational analysis of the signal and roundabout options.

Capacity/Level-of-Service Analysis

An analysis of traffic capacity was conducted for the primary access intersections using the methods published in the Highway Capacity Manual and available through the Synchro traffic analysis software. The methods consider traffic volume, number of lanes, intersection control, and signal timing (among other parameters) as inputs for a calculation of traffic delay which is classified into a letter-grade “level-of-service” rating from A to F. The LOS A rating indicates non-congested, low-delay, low-volume conditions, while LOS F indicates congested, high-delay conditions where traffic volume exceeds capacity. LOS D is the lowest level of service that is considered acceptable by PennDOT, Ferguson Township, and State College Borough for new intersection design in urbanized areas. The intersections were analyzed using the forecasted 2025 volumes, which represent the likely horizon year (opening year + 5 years) that would be specified in a PennDOT traffic impact study.

**Table 4** gives the intersection performance results for the AM Peak hour (**4a**) and PM Peak Hour (**4b**). Performance is described by delay (in terms of seconds per vehicle) and level-of-service letter grades for the overall intersection and the worst individual movement. These results assume that the New Connection is made at that location and a traffic signal or roundabout is installed. The worst individual movement is identified according to the approach direction and street name. Delay and LOS are given for roundabout operation where they were recommended for further consideration under the “Evaluation of Traffic Control Options”.

**Table 4a. AM Peak Hour Intersection Performance**

| Intersection                                 | Traffic Signal |                              | Roundabout           |                        |
|--|----------------|------------------------------|----------------------|------------------------|
|  | Intersection   | Worst Movement               | Intersection         | Worst Movement         |
| North Atherton Street/<br>White Course Drive | B (11.3)       | EB Wh. Crs. Left<br>D (43.4) | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Corl Street          | A (8.0)        | NB Corl<br>D (50.1)          | C (17.4)             | EB College<br>C (21.5) |
| West College Avenue/<br>Osmond Street        | A (9.6)        | SB Connection<br>D (44.7)    | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Butz Street          | A (8.5)        | SB Connection<br>D (42.6)    | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Buckhout Street      | A (8.6)**      | SB Connection<br>C (29.1)    | C (16.5)             | EB College<br>C (20.1) |

Notes:

All delay and level-of-service results are from the HCM 6<sup>th</sup> Edition methodology, except as noted:

\*\* Delay and level-of-service results from Synchro Percentile Delay methodology.

**Table 4b. PM Peak Hour Intersection Performance**

| Intersection                                 | Traffic Signal |                              | Roundabout           |                        |
|--|----------------|------------------------------|----------------------|------------------------|
|  | Intersection   | Worst Movement               | Intersection         | Worst Movement         |
| North Atherton Street/<br>White Course Drive | B (10.6)       | EB Wh. Crs. Left<br>D (38.0) | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Corl Street          | C (24.4)       | SB Connection<br>D (54.4)    | D (27.7)             | WB College<br>E (39.9) |
| West College Avenue/<br>Osmond Street        | C (30.8)       | SB Connection<br>D (51.4)    | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Butz Street          | C (32.3)       | SB Connection<br>D (51.6)    | <i>Not analyzed.</i> |                        |
| West College Avenue/<br>Buckhout Street      | C (23.0)**     | SB Connection<br>C (33.8)    | C (22.4)             | WB College<br>D (29.6) |

Notes:

All delay and level-of-service results are from the HCM 6<sup>th</sup> Edition methodology, except as noted:

\*\* Delay and level-of-service results from Synchro Percentile Delay methodology.

*Atherton Street/White Course Drive Intersection Results*

The White Course Drive/North Atherton Street intersection operates with acceptable delays on all movements and performs acceptably overall at LOS C or better during the 2025 AM and PM peak hours. Results for the intersection are the same, regardless of which West College Avenue Connection Option is chosen. We note that, in the future conditions, the traffic volume on the Southbound Atherton Street right-turn movement justifies the construction of an exclusive right-turn lane, according to PennDOT guidelines. The right-turn lane and signal timing/phasing adjustments were assumed in the future conditions analysis.

#### West College Avenue/New Connection Intersection Results

*Traffic Signal Results* – Each of the West College Avenue Connection Option intersections operate with acceptable delays on all movements and perform acceptably overall at LOS C or better during the 2025 AM and PM peak hours assuming installation of a traffic signal. The New Connection approach requires two exiting lanes to achieve acceptable LOS D during the PM peak hour. However, we note that delay on the New Connection approach is near the LOS E threshold (55.0 seconds per vehicle) during the PM peak hour. The traffic volume on West College Avenue is also close to capacity during the PM peak hour. With these two competing movements operating near capacity, the signal would have little reserve capacity for future traffic growth.

*Roundabout Results* – At Buckhout Street, the roundabout operates with acceptable delays on all lanes and performs acceptably overall at LOS C during the 2025 AM and PM peak hours. Similar to the traffic signal, the traffic volume on Westbound College Avenue is close to capacity during the PM peak hour. However, with the roundabout, delay on the New Connection approach would not be as high as with the signal. Based on these results, the roundabout provides equal or better traffic performance than the signal for the same traffic conditions and offers some reserve capacity for future traffic growth. At Corl Street, the roundabout operates acceptably overall at LOS D or better during the 2025 AM and PM peak hours. However, during the 2025 PM peak hour, the WB College Avenue approach lane operates at LOS E, indicating that delays exceed the acceptable threshold for new design. As such, converting the existing Corl Street signal to a roundabout would not be recommended under conditions where the New Connection is made to Corl Street.

#### **4.5.4 Preferred West College Avenue Connection Option**

A comparison of the Connection options is given in **Table 5**. The Buckhout Street Connection is the University's preferred option, based on the following:

- Provides the shortest connection route, which reduces construction cost, maintenance cost, and stormwater impacts.
- Requires no new right-of-way for the connection roadway.
- Offers the option for installing a roundabout or traffic signal.
- Provides intersection spacing that is optimal for coordination (with a traffic signal).

Staff from State College Borough and Ferguson Township also expressed support for the Buckhout Street Connection option at the Municipal and Agency Coordination Meeting noted below. The roundabout concept received support at this meeting, but additional design and analysis are necessary to resolve questions about right-of-way, pedestrian and bicycle safety, truck circulation, and long-term compatibility of the roundabout with the evolving vision for State College Borough's West End Plan and Ferguson Township's Terraced Streetscape District.

**Table 5. Benefits & Challenges Comparison of West College Avenue Connection Options**

|                        | <b>Corl Street Connection</b>  | <b>Osmond Street Connection</b>  | <b>Butz Street Connection</b>  | <b>Buckhout Street Connection</b>   |
|------------------------|--|--|--|---|
| <b>Design Features</b> | <ul style="list-style-type: none"> <li>✓ Modify existing traffic signal: align SB Corl Street with NB Corl Street</li> <li>✓ Three lane cross-section: 2 exiting lanes; 1 entering lane</li> <li>✓ Roundabout is feasible if right-of-way can be acquired</li> <li>✓ Lengthen West College Ave left turn lanes</li> </ul>  | <ul style="list-style-type: none"> <li>✓ Traffic signal warranted</li> <li>✓ Interconnect with Corl Street signal</li> <li>✓ Three lane cross-section: 2 exiting lanes; 1 entering lane</li> <li>✓ Restripe West College Ave for left turn lanes</li> </ul>  | <ul style="list-style-type: none"> <li>✓ Traffic signal warranted</li> <li>✓ Interconnect with Corl Street signal</li> <li>✓ Three lane cross-section: 2 exiting lanes; 1 entering lane</li> <li>✓ Restripe West College Ave for left turn lanes</li> </ul>  | <ul style="list-style-type: none"> <li>✓ Traffic signal warranted</li> <li>✓ Interconnect with Corl Street signal</li> <li>✓ Three lane cross-section: 2 exiting lanes; 1 entering lane</li> <li>✓ Roundabout is feasible if right-of-way can be acquired.</li> <li>✓ Restripe West College Ave for left turn lanes</li> </ul>  |
| <b>Benefits</b>        | <ul style="list-style-type: none"> <li>+ Avoids O.W. Houts site</li> <li>+ No new right-of-way acquisition</li> <li>+ Projected to operate acceptably with traffic signal</li> </ul>   | <ul style="list-style-type: none"> <li>+ Avoids O.W. Houts site</li> <li>+ Projected to operate acceptably with traffic signal</li> </ul>  | <ul style="list-style-type: none"> <li>+ Established street</li> <li>+ Avoids O.W. Houts site</li> <li>+ Avoids impacts to drainage features</li> <li>+ Projected to operate acceptably with traffic signal</li> </ul>   | <ul style="list-style-type: none"> <li>+ Shortest connection route</li> <li>+ No new right-of-way acquisition</li> <li>+ Best option for intersection spacing</li> <li>+ Projected to operate acceptably with traffic signal or single-lane roundabout</li> <li>+ Either signal or roundabout provide acceptable performance</li> </ul>   |
| <b>Challenges</b>      | <ul style="list-style-type: none"> <li>- Construction cost (longest route)</li> <li>- Impacts to drainage features, utilities</li> <li>- Relocate portion of Corl Street north of West College Avenue</li> <li>- Potential to induce cut-through traffic in State College Borough</li> <li>- Projected to operate unacceptably with single-lane roundabout</li> <li>- Improvements required on West College Avenue to accommodate new connection.</li> </ul> | <ul style="list-style-type: none"> <li>- Construction cost</li> <li>- Right of way acquisition; widening for 3-lane width</li> <li>- Impacts to drainage features, utilities</li> <li>- Driveway conflicts on West College Ave</li> <li>- Improvements required on West College Avenue to accommodate new connection.</li> </ul> | <ul style="list-style-type: none"> <li>- Construction cost</li> <li>- Right of way acquisition; widening for 3-lane width</li> <li>- Impacts to drainage features, utilities</li> <li>- Driveway conflicts on West College Ave</li> <li>- Improvements required on West College Avenue to accommodate new connection.</li> <li>- Residential street with several homes close to the roadway</li> </ul> | <ul style="list-style-type: none"> <li>- Impacts to drainage features, utilities</li> <li>- Driveway conflicts on West College Ave</li> <li>- Lane alignment and WB College Ave transition from 2 lanes (one way) to 1 through lane</li> <li>- O.W. Houts site environmental mitigation</li> <li>- Bisects O.W. Houts property and, as a result, would reduce area available for future development</li> <li>- Improvements required on West College Avenue to accommodate new connection and lane configurations.</li> </ul> |

#### 4.5.5 Municipal and Agency Coordination

A municipal and agency outreach/coordination meeting was held on December 13, 2017 at the COG Building, General Forum Room. Among those in attendance were staff-level representatives from Ferguson Township, State College Borough, Centre Area Transportation Authority (CATA), Centre Regional Planning Agency (CRPA), PennDOT District 2-0, Penn State (PSU) and McCormick Taylor (MT). PSU and MT staff led the meeting presentation and the facilitated discussion and feedback portions. A copy of the presentation, meeting agenda, feedback collected in the form of bullet points take throughout the course of the discussion, and a sign in sheet can be found in **Appendix B.4**.

It was noted that the purpose of this initial outreach was to present the attendees with the current project information (including the location of the structure and anticipated size and future development of West Campus) as well as garner preliminary feedback related to the various alignments under consideration and key pertinent considerations to account for as the project progresses through preliminary and final design and initial thoughts on the future permitting and traffic impact studies.

#### 4.5.6 Environmental Assessment

A review of the environmental features associated with the project area shown in **Figure 6** included two main areas of concern: cultural resources and threatened and endangered species. Based on the project type and project area, the following items were not reviewed as part of this feasibility study: Wetlands, Streams, Floodplain locations, and Groundwater/ Geology/ Sinkholes. Depending on the selected alternative for advancement into preliminary and final design, additional investigation and review may be required.

The Pennsylvania State Historic Preservation Office (PA SHPO) Cultural Resources Geographic Information Systems (CRGIS) database was reviewed to identify historic properties within the proposed study area of the project. There are two previously identified resources of note: Holmes-Foster/Highlands Historic District (Key # 102343) and State College Fraternity Houses (Key # 079011). Within the study area, there appear to be several buildings fifty years or older. Three (3) of these may require further evaluation for the National Register of Historic Places (NRHP) as noted in **Appendix B.5**. In coordination with Penn State and based on the final selected roadway alignment, additional studies may be required within the projects final Area of Potential Effects (APE) boundary. In addition, it is anticipated that coordination with the PA SHPO may be required due to the presence of the NRHP listed Holmes-Foster/Highlands Historic District within the proposed study area.

A review of the project areas using the Pennsylvania Natural Heritage Program's (PNHP) Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool was completed in order to identify any known rare, threatened or endangered plants or animals and critical habitats within the project area. No threatened or endangered plants or animals were found within the project area. The results of the draft PNDI search can be found in **Appendix B.5**.



Figure 6. Approximate Area for Environmental and Hazardous Material Assessment

#### 4.5.7 Hazardous Material

A preliminary hazardous waste evaluation was conducted for the project area, located on University Park West Campus, Ferguson Township, and State College Borough in Centre County, Pennsylvania. The project is based on the preliminary alternatives for a feasibility study focused on extending White Course drive and providing a connection to the future West Campus Parking Structure. A full Technical Memorandum can be found in **Appendix B.6**.

In summary, this memorandum documents the results of the first step of a phased approach to a Phase 1 Environmental Site Assessment (ESA). A full Phase 1 ESA was not completed at this time based on the scope and timeframe of the current work order for the project; however, this will be performed during the design phase of the project. The environmental conditions that were evaluated include, but were not limited to:

- hazardous and non-hazardous waste generation
- storage and disposal
- aboveground storage tanks (ASTs) and underground storage tanks (USTs)
- uncontrolled releases of environmentally sensitive materials.

The investigation included a windshield survey and a limited background review. The background review included the following: Environmental Data Resources (EDR) report (which includes federal and state listings), a review of agency websites including: the Pennsylvania Department of Environmental Protection (PaDEP); Environment, Facility, Application, Compliance Tracking System (eFACTS); and the United States Environmental Protection Agency (EPA) Envirofacts and eMapPA websites, Sanborn mapping review, and historic aerial mapping review.

The following tasks were not included in this investigation; physical setting sources review (including geological and soils background), PaDEP file review, full site reconnaissance to include property owner interviews and site reconnaissance forms, deed review, property line investigations, correspondence/interviews with local officials, and lead-based paint and asbestos containing material (ACM) inspections.

In addition to the other background information, coordination with knowledgeable PSU staff from OPP Engineering Services and Environmental Health & Safety occurred for three key properties within the project study area; Frank Lill & Son Storage Lot (formerly O.W. Houts), the Nittany Minit Mart/ Sunoco and the West Campus Chiller Building. The details of this coordination are included in the Technical Memorandum in the **Appendix B.6**.

For purposes of this Hazardous Waste Memorandum, sites were ranked according to low risk, medium risk or high risk, and given a recommendation. The following recommendation statements were used; “Initiate Phase I ESA”, “No Phase I ESA at this time”, or “No Phase I ESA”. Eight sites with environmental concerns located within potential areas of impact were found to support an “Initiate Phase I ESA” recommendation. The eight sites include the Apartment Complex (Atlantic Refinery), Blue Course Bikeway/ W Campus Drive/ Old Railroad Grade, CSB Parking Lot, Frank Lill & Son Storage Lot (former O.W. Houts property), Nittany Minit Mart/ Sunoco, PSU-Patterson Street Substation, Sparks Street Parking Lot and West Campus Chiller Building). During preliminary engineering – as the roadway alignment and adjacent supporting connections, stormwater related mitigation, and/or staging areas for the project are developed – these recommendations (found in Table 4 of the Technical Memorandum) should be referenced to determine if additional evaluation will be warranted.

#### **4.5.8 Roadway Drainage**

A planning-level roadway drainage system was developed in order to review feasibility and to address costs. The proposed roadway drainage system will capture the roadway water and convey it toward the West Campus stormwater basin for most of the White Course Drive Relocation and a majority of the new connector roadway. A small portion of the White Course Drive roadway drainage area east of the existing parking / information kiosk will flow eastward into the Trunk Line I system and across Atherton Street, which is consistent with the existing drainage pattern. PSU Water Resource Publication OPP-WRP-SR-TLI-2017 sets allowable peak runoff rates for the Atherton Street drainage area. Based on the current project layout and understanding, increases in the drainage area to the Trunk Line I system are not anticipated. Details related to the runoff/flow related to the new drainage system are included in the SWM Section found below.

#### 4.5.9 Erosion and Sediment Pollution Control

A planning-level Erosion and Sediment Pollution Control system (E&S) was developed in order to review the feasibility and to address costs. Major features of this system would include converting the existing West Campus Stormwater basin into a Sediment Basin during construction, and constructing a small Sediment Trap at the eastern end of the project, near Atherton Street. E&S Best Management Practices such as rock construction entrances, concrete washouts, storm inlet protection, and compost filter sock will be included and finalized as part of final design.

### 4.6 STORMWATER MANAGEMENT

#### 4.6.1 Regulatory Summary

Penn State stormwater policy and state and local stormwater regulations were reviewed to assess stormwater requirements for the West Campus Parking Garage project as well as for West Campus buildout. Applicable policy and regulations are presented in **Appendix C.1**.

In accordance with Penn State stormwater policy, *“no future major development is permitted within the West Campus Basin’s drainage area without the West Campus Basin being improved or reconstructed.”* This project is the first major development in the West Campus Basin’s drainage area since this policy was established. Therefore, the project must include reconstruction of the West Campus Basin to a size and geometry to manage runoff from the West Campus Basin drainage area (white outline in **Figure 7** below) through West Campus buildout in accordance with the 2006 Master Plan.



**Figure 7. Stormwater Management and Project Area**

The project area for the West Campus Parking Garage and White Course Drive improvements project is illustrated in **Figure 7**. Although most of West Campus is located in the Borough of State College, a portion of the West Campus Basin (including its outfall), a small portion of White Course Drive, and the proposed pumped reuse system are in Ferguson Township. Therefore, the project will need to meet stormwater and land development regulations for both the Borough of State College and Ferguson Township. Although their regulations are similar, there are differences (see **Appendix C.1**). Both municipalities require submission of stormwater management plans documenting compliance with their respective ordinances.

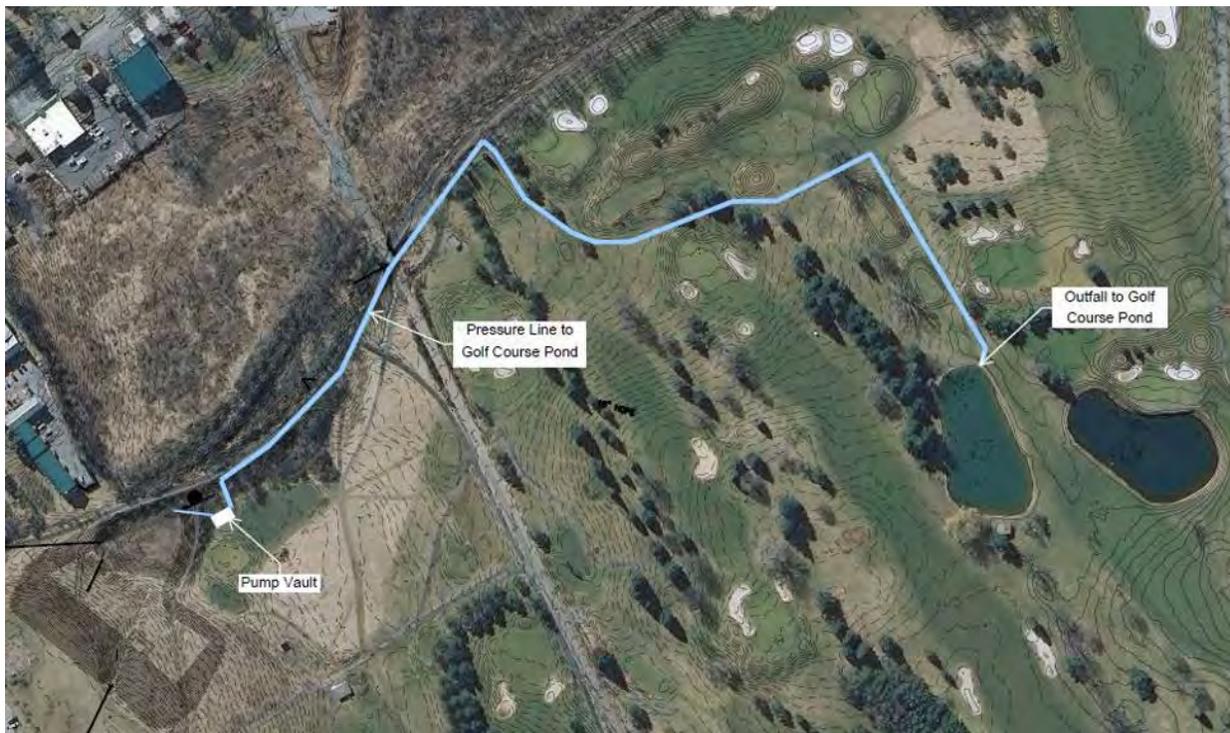
Since the project will create more than an acre of disturbance state regulations require that a NPDES permit be issued for the project for stormwater discharges associated with construction activities. An individual permit will be required since the areas identified as draining to Trunk Line I and the Beaver Avenue System in **Figure 7** drain to Thompson Run, a special protection water.

#### **4.6.2 West Campus Basin Redesign**

Analyses were performed to determine the West Campus stormwater basin footprint necessary to meet regulatory requirements for West Campus buildout. Three (3) basin scenarios were considered; (1) peak runoff rate control only, (2) peak runoff rate control and water quality management, and (3) peak rate control, water quality, and volume management. Each of these scenarios was evaluated considering full West Campus buildout within the West Campus Drainage Area in accordance with the 2006 West Campus Masterplan. The analyses are documented in **Appendix C.2** through **C.4**.

Several alternatives for volume and water quality management were evaluated for the West Campus Basin drainage area (See **Appendix C.3**). Volume management alternatives included storm runoff reuse and ultra-extended detention. The preferred reuse option discussed at a meeting on December 4, 2017 with representatives from the PSU Golf Courses, Grounds Maintenance, and the Office of Physical Plant involved using harvested rainwater from the West Campus Basin drainage area for golf course irrigation. This option is detailed in **Appendix C.4**. The preferred reuse option involves capturing runoff from all surfaces in the West Campus Basin drainage area and conveying it to the West Campus Basin for treatment. It would then be pumped to one or more of the golf courses' ponds for storage. This alternative is illustrated in **Figure 8**. If the reuse option does not come to fruition, volume management will be accommodated using ultra-extended detention. Water quality options considered included treatment of all West Campus runoff in the redesigned West Campus Basin or the construction of individual water quality elements as part of each West Campus building project. The recommended alternative - from both a cost and logistical perspective - is to use the West Campus Basin to provide the water quality function.

The preferred basin design is one that will meet all three stormwater regulatory elements – volume management, water quality treatment, and peak rate control. **Figure 9** illustrates the conceptual basin grading. A schematic basin cross section is provided in **Figure 10**. To minimize the risk of sinkhole formation an impervious liner is proposed under the basin. An amended soil layer and underdrain system are proposed above the liner to address regulatory water quality requirements. A 2-foot capture depth is proposed to address volume management if the stormwater reuse opportunities discussed in



**Figure 8. Reuse Water Pump System**

**Appendix C.3** and **C.4** do not come to fruition. Forebays are proposed at each conveyance element inflow to the basin to provide a settlement function for sediment and debris as a build-up of sediment and anti-skid was observed in the existing basin. The forebays will provide a convenient location for removal of any sediment build-up. The basin is to be seeded with a wildflower or other deep-rooted seed mix to facilitate infiltration and reduce maintenance requirements.

#### **4.6.3 Stormwater Management for the Thompson Run Watershed**

A small section of the White Course Drive improvements near West College Avenue are not tributary to the West Campus Basin but drain instead to the Borough of State College’s Beaver Avenue/Calder Way drainage system (See **Figure 7**). Likewise, a small section of the White Course Drive improvements near College Avenue drain to the Penn State Trunk Line I drainage area (See **Figure 7**). These areas ultimately drain to the Thompson Run Watershed. As indicated previously, the Thompson Run Watershed is a special protection water with an existing use of High Quality, Cold Water Fishes (HQ-CWF).

##### Stormwater Control for Runoff to the Beaver Avenue Drainage System

The White Course Drive improvements in the Beaver Avenue conveyance system drainage area are in a location that is currently impervious. Therefore, no increase in peak runoff to the Beaver Avenue system is anticipated. However, the Beaver Avenue drainage system has capacity issues, particularly near Atherton Street. Local ordinances give the municipal engineer authority to require that 20% of existing impervious area be treated as meadow in good condition for peak rate analysis when there is a known capacity issue downstream. Therefore, peak rate controls may be required for runoff from this area. Options for providing runoff rate management include impervious area conversion to pervious area using landscape restoration techniques or installation of a small subsurface detention facility.

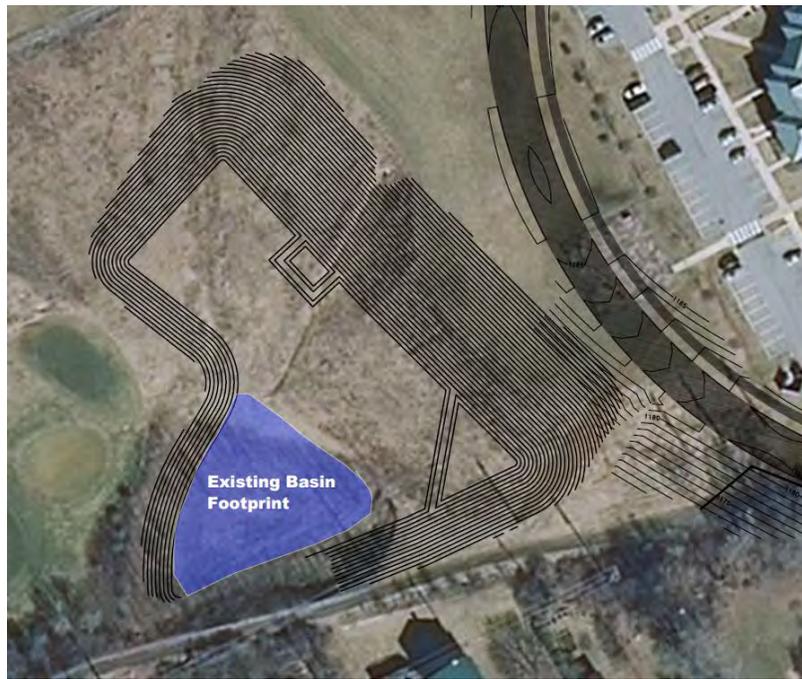
Runoff volume management for this area can be provided using a combination of tree plantings and landscape restoration, or the installation of a small under-drained raingarden. Use of a raingarden would also provide water quality management. Water quality management could also be provided using a manufactured device such as a vortex chamber.

Stormwater Control for Runoff to the Trunk Line I System

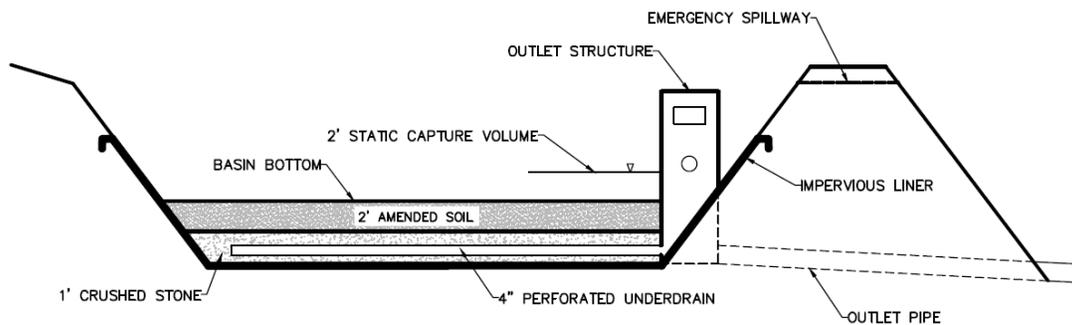
As indicated above, a small portion of the White Course Drive project area drains to the Penn State Trunk Line I

drainage area. Although the proposed White Course Drive profile will direct additional runoff towards Atherton Street, drainage for the roadway will be captured in a way that maintains the existing West Campus Basin drainage divide. In addition, no new impervious surfaces are proposed within the project area tributary to the Trunk Line I system. Therefore, peak rate increases to the Trunk I system are not anticipated.

The Trunk Line I drainage system is known to have insufficient capacity. Therefore, if required by the municipal engineer, 20% of existing impervious area may need to be treated as meadow in good condition. As indicated above, this would trigger a small amount of peak rate management. Options for managing peak runoff rates here include impervious area conversion to pervious area using landscape restoration techniques, or subsurface detention.



**Figure 9. Schematic West Campus Basin Grading**



**Figure 10. Schematic West Campus Basin Cross Section**

Runoff volume management for this area can be provided using a combination of tree plantings and landscape restoration, or the installation of a small under-drained raingarden. Use of a raingarden would also provide water quality management. Water quality management could also be provided using a manufactured device such as a vortex chamber.

See **Appendix C.2** and **C.3** for additional discussion of stormwater control requirements for areas tributary to Thompson run.

#### Consideration for Future Development of the Former OW Houts Property

**Figure 7** illustrates two (2) potential West Campus Basin drainage expansion areas on the impervious OW Houts property. Runoff from these areas currently drains to the Corl Dry Well. As an option, runoff from these areas could be routed to the West Campus Basin. Although it is currently OPP's preference that these areas continue to be directed to the Corl Street Dry Well, if a decision is made to route runoff from these areas to the West Campus Basin, the basin would need to be enlarged. A potential basin expansion area is also identified in **Figure 7**.

### 4.6.4 Conveyance System Upgrades

It is anticipated that a portion of the White Course Drive drainage system will be connected to the existing West Campus storm drain system running between the Earth and Engineering Science Building and the Applied Science Building. This connection may result in an increase in runoff to the existing system. The existing conveyance system should be evaluated to determine if diverting additional runoff to the system will result in capacity issues. Costs have been included in **Appendix C.5** to provide for a partial upgrade to the existing conveyance system.

### 4.6.5 Utility Impacts

Potential utility conflicts were investigated related to the enlargement of the West Campus Basin, construction of the reuse water collection system under reuse Alternatives B and C, and for possible upgrades to the West Campus storm conveyance system (if necessary). This investigation was based on a preliminary analysis of existing utility information provided by the University. The West Campus Basin enlargement will result in a conflict with an existing 14-inch waterline. It is estimated that approximately 500 LF of new water line will need to be constructed as part of this relocation and was accounted for in the cost estimate.

The only other possible utility conflicts would be associated with construction of any new or upgraded West Campus storm conveyance lines. An area of concern is in the corridor west of the Applied Science Building and running just east of the Earth and Engineering Science and Leonhard Building.

## 5. BUDGET INFORMATION

### 5.1 ESTIMATED PROJECT BUDGET

A Cost Estimate to construct the proposed garage and all necessary road extensions, enlargements, and realignments by Penn State.

TimHaahs, McCormick Taylor, and NTM have estimated the cost of construction for the work as included in this feasibility study.

#### Summary

The total for all work, including soft costs, varies for each option. See below for the summary and the Appendix for additional information.

| <i>Concept Name and Description</i>                            | <i>Spaces Provided</i> | <i>Estimated Cost</i> |
|--|------------------------|-----------------------|
| Concept 1, 6 tiers   | 1,676                  | \$ 65,524,316         |
| Concept 1, 6 tiers, no solar array                             | 1,676                  | \$56,711,692          |
| Concept 1, 6 tiers, no solar array, shorten by one 48' bay     | 1,446                  | \$50,415,963          |
| Concept 1, 6 tiers, Transit Station, Café, Retail/Office shell | 1,596                  | \$ 67,949,178         |
| Concept 1, 5 tiers   | 1,384                  | \$ 57,820,363         |
| Concept 1, 4 tiers   | 1,092                  | \$ 50,152,777         |
| Concept 2, 6 tiers, Transit Station, Café Retail/Office shell  | 1,596                  | \$ 67,876,951         |
| Concept 3, 1 tier, Athletic Fields                             | 1,070                  | \$ 123,821,048        |
| Concept 4, 6 tiers, no solar array                             | 1,585                  | \$56,782,696          |

Calculations by each consultant are represented on worksheets and summarized on the formatted worksheet provided by Penn State, attached in **Appendix D.1**.

## 6. PROJECT SCHEDULE

Based on the scope of this project, the schedule drivers will include the Traffic Impact Study (TIS), and the Land Development and NPDES approvals in design. In addition to the design effort, there is also the impact of reviews by the appropriate agencies and authorities, permitting, and Penn State Project Decision Review Board and Board of Trustee approvals. Once construction starts, there will be multiple phases of work required to maintain the existing roadway connections during the periods of heavy use, with limited down-time when the switch is made to the new roadway connections. The entire project, as dictated by Penn State, is desired to be completed based on the current capital plan by the Summer of 2020. The new parking garage and new roadway connections must be operational prior to the construction of the new engineering buildings, which will necessitate the closure of existing surface lots.

The Feasibility Study, which began in October of 2017, will be completed with PDRB approval of Gate 1 Programming expected to be in April 2018. The Traffic Impact Study (TIS) is underway with a beginning date of March 2, 2018. TIS approval (assuming an NTP for the work order by May 1, 2018) is anticipated by March 2019. Assuming a standard design-bid-build schedule, the Design Schedule for the proposed garage will begin with an anticipated Notice-to-Proceed of August 1, 2018 and completion in September 2019. The Construction Schedule for the proposed Garage Concept 1 would begin in September 2019, and will include the construction for both the parking structure as well as the roadway/stormwater management basin, and be complete in November 2020. For Garage Concept 4, the roadway work would need to be completed in advance of the groundbreaking for the structure. As such, the roadway work for White Course Drive would be weather dependent and likely begin in September 2019 with completion by October 2019. The structure, remaining roadway connections, and the stormwater management basin efforts would then conclude in January 2021. Consideration was given to advancing the necessary roadway work as a separate project to compress the schedule. However, local and state permit requirements negated the benefits of this approach.

Some considerations that may aid in expediting the schedule include the following:

- Working meetings to expedite reviews on the Traffic Impact Study (TIS) with the municipalities and PennDOT at each stage of the process to build alignment and shorten review timeframes.
- Early Action precast package for the structure - all forecaster engineering would need to be complete and shop drawings approved prior to the Contractor breaking ground.
- Allowing occupancy at substantial completion and allow punch-list items to be completed post opening day.
- Consider Design-Build methodology – which would still require TIS, NPDES, and Land Development approvals.

A bullet point summary of the key dates is included below for Concept 1, for further detail, refer to the Project Bar Chart Schedule attached as **Appendix D.2**.

1. ***Feasibility Study***
  1. Final Submission 03/29/2018
  2. Gate 1 Approval 04/18/2018
2. ***Consultant Selection***
  1. RFQ Process begins 05/01/2018
  2. BOT Selection 07/20/2018
  3. Notice To Proceed 08/01/2018
3. ***Roadway Site Design and Approval***
  1. Traffic Impact Study  
03/02/2018 - 03/01/2019
  2. Roadway Design  
09/10/2018 – 06/15/2019
  3. Utility Coordination  
04/01/2019 – 05/30/2019
  4. Final Documents  
06/15/2019
  5. Land Development Approval  
09/09/2019
4. ***Structure Design***
  1. Schematic  
11/18/2018 – 01/19/2019
  2. Design Development  
01/19/2019 – 03/22/2019
  3. Construction Docs  
03/22/2019 – 05/30/2019
  4. Penn State Review 06/12/2019
5. ***PDRB / BOT Approvals***
  1. Gate 2B Approval 07/12/2019
  2. Gate 3 Approval 09/09/2019
6. ***Bid / Construction***
  1. Selection 09/02/2019
  2. NTP 09/09/2019
  3. Structure 09/09/2019 – 11/01/2020
  4. Roadway 05/01/2020 – 08/28/2020
  5. SWM 04/01/2020 – 08/28/2020
  6. Opening Day 11/18/2020

PSU Project Number: XX-XXXXXXXXXX

**ConsensusDocs 410 (Modified)**  
**STANDARD DESIGN-BUILD AGREEMENT AND GENERAL CONDITIONS**  
**BETWEEN OWNER AND DESIGN-BUILDER**  
**(Cost of the Work Plus a Fee with a GMP), v. 02/2018**



**TABLE OF ARTICLES**

1. GENERAL PROVISIONS
2. DESIGN-BUILDER'S RESPONSIBILITIES
3. OWNER'S RESPONSIBILITIES
4. SUBCONTRACTS
5. TIME
6. COMPENSATION
7. COST OF THE WORK
8. CHANGES IN THE WORK
9. PAYMENT FOR CONSTRUCTION PHASE SERVICES
10. INDEMNITY
11. SUSPENSION, NOTICE TO CURE, AND TERMINATION
12. DISPUTE MITIGATION AND RESOLUTION
13. MISCELLANEOUS
14. CONTRACT DOCUMENTS
15. INSURANCE
16. BONDS



ConsensusDocs™ 410 – Standard Design-Build Agreement and General Conditions Between Owner and Design-Builder (Cost of Work Plus Fee with GMP) - © 2011, REV 04/14. THIS DOCUMENT MAY HAVE BEEN MODIFIED. The ConsensusDocs technology platform creates a redline comparison to the standard language which the purchaser of this contract is authorized to share for review purposes. Consultation with legal and insurance counsel are strongly encouraged. You may only make copies of finalized documents for distribution to parties in direct connection with this contract. Any other uses are strictly prohibited.

**AGREEMENT**

PSU Project Number: **XX-XXXXXX**

| FOR PSU USE ONLY |  |
|------------------|--|
| BUDGET           |  |
| JOB              |  |
| REFERENCE        |  |
| CODE             |  |

This Agreement is made this \_\_\_\_\_ day of \_\_\_\_\_ in the year \_\_\_\_\_, by and between the OWNER: **THE PENNSYLVANIA STATE UNIVERSITY**, a state-related institution and instrumentality of the Commonwealth of Pennsylvania subject to the Pennsylvania nonprofit corporation laws, with an office and principal place of business at University Park, Centre County, Pennsylvania, and the DESIGN-BUILDER:

**XXXXXXXXXX**  
**XXXXXXXXXXXXXXXXXXXX**  
**XXXXXXXXXXXX**

Tax identification number (TIN): **XX-XXXXXX**  
Design Professional Licensing No. in the state of the Project: **XXXXXXXX**

for services in connection with the following project:

**(PSU Project name here)**, PSU Project No. **XX-XXXXXX**, located at The Pennsylvania State University, **XXXXXXXXXX** campus location, **XXXXXXXXXX** Township, **XXXXXXX** County, Pennsylvania. ("Project")

Notice to the Parties shall be given at the above addresses. In consideration of the promises set forth herein, and with intent to be legally bound, the parties agree as follows:

**ARTICLE 1 GENERAL PROVISIONS**

1.1 TEAM RELATIONSHIP The Parties each agree to proceed with the Project on the basis of trust, good faith and fair dealing and shall take all actions reasonably necessary to perform this Agreement in an economical and timely manner, including consideration of design modifications and alternative materials or equipment that will permit the Work to be constructed within the Guaranteed Maximum Price (GMP) and by the Dates of Substantial Completion and Final Completion if they are established by Amendment 1. The Design-Builder agrees to procure or furnish, as permitted by the Law, the design phase services and construction phase services as set forth below.



1.1.1 The Design-Builder represents that it is an independent contractor with respect to Owner and that it has the necessary expertise and experience required for the undertaking of the Project.

1.1.2 Neither the Design-Builder nor any of its agents or employees shall act on behalf of or in the name of the Owner unless authorized in writing by the Owner's Representative.

1.1.3 The Parties shall perform their obligations with integrity, ensuring at a minimum that each: (a) avoid conflicts of interest and discloses promptly any to the other Party, and (b) warrant that it has not and shall not pay or receive any contingent fees or gratuities to or from the other Party, including its agents, officers and employees, Subcontractors or others for whom they may be liable, to secure preferential treatment.

1.2 DESIGN-PROFESSIONAL Architectural and engineering services shall be procured from licensed, independent design professionals retained by the Design-Builder or furnished by licensed employees of the Design-Builder, as permitted by the Law. The person or entity providing architectural and engineering services shall be referred to as the Design-Professional. If the Design-Professional is an independent design professional, the architectural and engineering services shall be procured pursuant to a separate agreement between the Design-Builder and the Design-Professional. The Design-Professional for the Project is:

XXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXX

### 1.3 DEFINITIONS

1.3.1 "Agreement" means this modified ConsensusDocs 410 Standard Design-Build Agreement and General Conditions Between Owner and Design-Builder (Cost of the Work Plus a Fee with a GMP), as modified, amendments, exhibits, addenda, and attachments made part of this agreement upon its execution.

1.3.2 The following exhibits are a part of this Agreement:

- Exhibit A: Design-Builder Proposal, dated XXXXXXXXXXXX, 2016 (XX pages, attached)
- Exhibit B: The Pennsylvania State University Design and Construction Standards listing (screen shot from website. 3 pages, attached).
- Exhibit C: Staff Hourly Billable Rates (located within attached D-B Proposal)
- Exhibit D: Project Milestone Schedule (located within attached D-B Proposal)
- Exhibit E: PSU Project Delivery System (v. March 12, 2012. 2 pages, attached).
- Exhibit F: Prevailing Wage Rates (Serial # XX-XXXXX, dated XX/XX/XXX. Incorporated via reference)
- Exhibit G: PSU BIM Addendum (dated March 15, 2012. 6 pages, attached).



1.3.3 “Business Day” means all Days, except weekends and official federal or state holidays where the Project is located.

1.3.4 A “Change Order” (at times referred to as “Amendment”) is a written order signed by the Owner and the Design-Builder after execution of this Agreement, indicating changes in the scope of the Work, Cost of the Work or Contract Time, including substitutions proposed by the Design-Builder and accepted by the Owner.

1.3.5 The “Contract Documents” consist of those documents identified in section 14.1.

1.3.6 The “Contract Time” is the period between the Date of Commencement and Final Completion.

1.3.7 “Cost of the Work” means the costs and discounts specified in ARTICLE 7.

1.3.8 “Day” means calendar day.

1.3.9 “Date of Commencement” is as provided for in section ARTICLE 5.

1.3.10 “Design-Builder's Fee” means the compensation paid to the Design-Builder for salaries and other mandatory or customary compensation of the Design-Builder's employees at its principal and branch offices except employees listed in subsection 7.2.2, general and administrative expenses of the Design-Builder's principal and branch offices other than the field office, and the Design-Builder's capital expenses, including interest on the Design-Builder's capital employed for the Work, and profit. Fee shall not apply to self-performed trade contract Work by the Design-Builder.

1.3.11 “Defective Work” is any portion of the Work not in conformance to the requirements of the Contract Documents.

1.3.12 “Final Completion” occurs on the date when the Design-Builder's obligations under this Agreement are complete and accepted by the Owner and final payment becomes due and payable.

1.3.13 “Laws” mean federal, Pennsylvania state and local laws, ordinances, codes, rules, and regulations applicable to the Work with which the Design-Builder must comply that are enacted as of the Agreement date.

1.3.14 “Material Supplier” is a person or entity retained by the Design-Builder to provide material and equipment for the Work.

1.3.15 “Others” means other contractors and all persons at the Worksite who are not employed by Design-Builder, its Subcontractors or Material Suppliers.

1.3.16 “Overhead” shall mean (a) payroll costs and other compensation of Design-Builder's employees in the Design-Builder's principal and branch offices; (b) general and administrative expenses of the Design-Builder's principal and branch offices including



charges against the Design-Builder for delinquent payments; and (c) the Design-Builder's capital expenses, including interest on capital used for the Work.

1.3.17 The "Owner" is the person or entity identified in the Agreement, and includes the Owner's Representative.

1.3.18 The "Owner's Program" is an initial description of the Owner's objectives that may include, but it not limited to: budget and time criteria; conceptual documents; design criteria; space, price and time requirements and relationships; performance requirements; flexibility and expandability requirements; special equipment and systems; site requirements; and other Project-specific technical materials and requirements.

1.3.19 The "Parties" are collectively the Owner and the Design-Builder.

1.3.20 The "Project," as identified in this Agreement, is the building, facility or other improvements for which the Design-Builder is to perform the Work under this Agreement. It may also include improvements to be undertaken by the Owner or Others.

1.3.21 A "Subcontractor" is a person or entity retained by the Design-Builder as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work. The term Subcontractor does not include the Design-Professional or any separate contractor employed by the Owner or any separate contractor's subcontractors.

1.3.22 "Substantial Completion" of the Work, or of a designated portion, occurs on the date when the Design-Builder's obligations are sufficiently complete in accordance with the Contract Documents so that the Owner may occupy or utilize the Project, or a designated portion, for the use for which it is intended, without unscheduled disruption. The issuance of a certificate of occupancy is not a prerequisite for Substantial Completion. This date shall be confirmed by a certificate of Substantial Completion signed by the Owner and the Design-Builder. The certificate shall state the respective responsibilities of the Owner and the Design-Builder for security, maintenance, heat, utilities, or damage to the Work, and insurance. The certificate shall also list the items to be completed or corrected, and establish the time for their completion and correction, within the timeframe, if any, established in Amendment 1 for the date of Final Completion.

1.3.23 "Subsubcontractor" is a party or entity who has an agreement with a Subcontractor or another Subsubcontractor to perform any portion of the Subcontractor's work.

1.3.24 "Terrorism" means a violent act, or an act that is dangerous to human life, property or infrastructure, that is committed by an individual or individuals and that appears to be part of an effort to coerce a civilian population or to influence the policy or affect the conduct of any government by coercion. Terrorism includes, but is not limited to, any act certified by the United States Secretary of Treasury as an act of terrorism pursuant to the Terrorism Risk Insurance Act, as amended.



1.3.25 The "Work" is comprised of all services to be provide by the Design-Builder in accordance with the Contract Documents, including but not limited to the Design Phase services procured or furnished in accordance with section 2.1, the GMP Proposal provided in accordance with section 2.2, the Construction Phase services provided in accordance with section 2.3, Additional Services that may be provided in section 2.11, and other services which are necessary to complete the Project in accordance with and reasonably inferable from the Contract Documents.

1.3.26 "Worksite" means the geographical area of the Project location mentioned in ARTICLE 1 where the Work is to be performed.

## **ARTICLE 2 DESIGN-BUILDER'S RESPONSIBILITIES**

The Design-Builder shall be responsible for procuring or furnishing the design and for the construction of the Work consistent with the Owner's Program, as such Program may be modified by the Owner during the course of the Work.

Design-Builder shall, consistent with applicable state licensing laws, provide through qualified, licensed design professionals employed by Design-Builder, or procured from qualified, independent licensed Design Professional(s), the necessary design services, including architectural, engineering and other design professional services, for the preparation of the required drawings, specifications and other design submittals to permit Design-Builder to complete the Work consistent with the Contract Documents. Nothing in the Contract Documents is intended or deemed to create any legal or contractual relationship between Owner and any Design Professional. The standard of care for all design professional services performed to execute the Work shall be the care and skill ordinarily used by members of the design profession practicing in the same field of specialty.

The Design-Builder shall exercise reasonable skill and judgment in the performance of its services consistent with the team relationship described in section 1.1, but does not warrant nor guarantee schedules and estimates other than those that are part of the GMP proposal.

The Design-Builder and the Owner may establish a fast-track approach to the design and construction services necessary to complete the Project. Such agreement establishing a fast-track approach, if any, and the Schedule of the Work shall be included as an exhibit to this Agreement. In the absence of such agreement, the Parties shall proceed in accordance with sections 2.1 and 2.3 below.

The Design-Builder's inclusion of proprietary specifications (exclusive of those which may be indicated/mandated in The Pennsylvania State University Design and Construction Standards) in any Contract Documents that are produced for the Project shall only be done so with the approval of the Owner.

### **2.1 DESIGN PHASE SERVICES**

2.1.1 PRELIMINARY EVALUATION The Design-Builder shall review the Owner's Program to ascertain the requirements of the Project and shall verify such requirements with the



Owner. The Design-Builder's review shall also provide to the Owner a preliminary evaluation of the site with regard to access, traffic, drainage, parking, building placement and other considerations affecting the building, the environment and energy use, as well as information regarding Laws and requirements. The Design-Builder shall also propose alternative architectural, civil, structural, mechanical, electrical and other systems for review by the Owner, to determine the most desirable approach on the basis of cost, technology, quality and speed of delivery. The Design-Builder will also review existing test reports but will not undertake any independent testing nor be required to furnish types of information derived from such testing in its Preliminary Evaluation. Based upon its review and verification of the Owner's Program and other relevant information the Design-Builder shall provide a Preliminary Evaluation of the Project's feasibility for the Owner's acceptance. The Design-Builder's Preliminary Evaluation shall specifically identify any deviations from the Owner's Program.

**2.1.2 PRELIMINARY SCHEDULE** The Design-Builder shall prepare a preliminary schedule of the Work. The Owner shall provide written approval of milestone dates established in the preliminary schedule of the Work. The schedule shall show the activities of the Owner, the Design-Professional and the Design-Builder necessary to meet the Owner's completion requirements. The schedule shall be updated periodically with the level of detail for each schedule update reflecting the information then available. If an update indicates that a previously approved schedule will not be met, the Design-Builder shall recommend corrective action to the Owner in writing.

**2.1.3 PRELIMINARY ESTIMATE** When sufficient Project information has been identified, the Design-Builder shall prepare for the Owner's acceptance a preliminary estimate utilizing area, volume or similar conceptual estimating techniques. The estimate shall be updated periodically with the level of detail for each estimate update reflecting the information then available. If the preliminary estimate or any update exceeds the Owner's budget, the Design-Builder shall make recommendations to the Owner.

**2.1.4 SCHEMATIC DESIGN DOCUMENTS** The Design-Builder shall submit for the Owner's written approval Schematic Design Documents, based on the agreed upon Preliminary Evaluation. Schematic Design Documents shall include drawings, outline specifications and other conceptual documents illustrating the Projects basic elements, scale, and their relationship to the Worksite. One set of these documents shall be furnished to the Owner. When the Design-Builder submits the Schematic Design Documents the Design-Builder shall identify in writing all material changes and deviations that have taken place from the Design-Builder's Preliminary Evaluation, schedule and estimate. The Design-Builder shall update the preliminary schedule and estimate based on the Schematic Design Documents.

**2.1.5 PLANNING PERMITS** The Design-Builder shall obtain and the Owner shall pay for all planning permits necessary for the construction of the Project unless as otherwise agreed to by the Parties.

**2.1.6 DESIGN DEVELOPMENT DOCUMENTS** The Design-Builder shall submit for the Owner's written approval Design Development Documents based on the approved Schematic Design Documents. The Design Development Documents shall further define the



Project including drawings and outline specifications fixing and describing the Project size and character as to site utilization, and other appropriate elements incorporating the structural, architectural, mechanical and electrical systems. One set of these documents shall be furnished to the Owner. When the Design-Builder submits the Design Development Documents, the Design-Builder shall identify in writing all material changes and deviations that have taken place from the Schematic Design Documents. The Design-Builder shall update the schedule and estimate based on the Design Development Documents.

**2.1.7 CONSTRUCTION DOCUMENTS** The Design-Builder shall submit for the Owner's written approval Construction Documents based on the approved Design Development Documents. The Construction Documents shall set forth in detail the requirements for construction of the Work, and shall consist of drawings and specifications based upon Laws enacted at the time of their preparation. When the Design-Builder submits the Construction Documents, the Design-Builder shall identify in writing all material changes and deviations that have taken place from the Design Development Documents. Construction shall be in accordance with these approved Construction Documents. One set of these documents shall be furnished to the Owner prior to commencement of construction. If a GMP has not been established, the Design-Builder shall prepare a further update of the schedule and estimate based on the Construction Documents.

#### **2.1.8 BIDDING AND AWARD OF TRADE CONTRACTS**

**2.1.8.1** All Work to be performed by Trade Contractors will be competitively procured. The Project Team will determine which trade packages will require prequalification by the Design-Builder. Design-Builder shall prequalify all bidders per established process approved by the Project Team. Review all bidders lists with Owner for approval before proceeding. Procurement of all trade packages shall be coordinated directly with The Pennsylvania State University Office of Physical Plant.

The following trade Categories of work, whether performed by Subcontractors bidding directly to the Design-Builder or if self-performed by the Design-Builder, require Pennsylvania State University prequalification:

- Asbestos Abatement
- Telecommunications
- Demolition/Hauling
- Access Control and Surveillance

**2.1.8.2** Establish bidding schedules, issue bidding documents, and conduct pre-bid conferences to familiarize bidders with the documents and with any special systems, materials, methods or conditions.

**2.1.8.3** Prepare bid analyses, and review bids with the Owner. Award Contracts. Design-Builder shall have final authority and responsibility for selection of all Trade Contractors, and award of all Trade Contracts. Design-Builder hereby specifically agrees to indemnify, defend and hold harmless the Owner and Owner's agents, employees, trustees and attorneys for any and all loss, damage, cost, charge, award,



verdict, judgment, liability or expense, including without limitation, reasonable attorneys' fees, arising out of any claim, actions or suits which are based upon or in any way related to the process of selecting Trade Contractors or the award of Trade Contracts for the project

2.1.8.4 The Design-Builder is permitted to use its own forces in the performance of Work of a temporary nature or as otherwise approved by the Owner.

## 2.1.9 OWNERSHIP OF DOCUMENTS

2.1.9.1 OWNERSHIP OF TANGIBLE DOCUMENTS The Owner shall receive ownership of the property rights of all documents, drawings, specifications, electronic data and information (hereinafter "Documents") prepared, provided or procured by the Design-Builder, its Design-Professional, Subcontractors or consultants and distributed to the Owner for this Project, upon the making of final payment to the Design-Builder or, in the event of termination under ARTICLE 11, upon payment for all sums due to Design-Builder pursuant to ARTICLE 9.

2.1.9.2 COPYRIGHT The Parties agree that the Owner shall obtain ownership of the copyright of all Documents. The Owner's acquisition of the copyright for all Documents shall be subject to the making of payments as required by the subsection above.

2.1.9.3 USE OF DOCUMENTS IN EVENT OF TERMINATION In the event of a termination of this Agreement pursuant to ARTICLE 11, the Owner shall have the right to use, to reproduce, and to make derivative works of the Documents to complete the Project, regardless of whether there has been a transfer of copyright under this section, provided payment has been made pursuant to subsection 2.1.9.1.

2.1.9.4 OWNER'S USE OF DOCUMENTS AFTER COMPLETION OF PROJECT After completion of the Project, the Owner may reuse, reproduce or make derivative works from the Documents solely for the purposes of maintaining, renovating, remodeling or expanding the Project at the Worksite. The Owner's use of the Documents without the Design-Builder's involvement or on other projects is at the Owner's sole risk, except for the Design-Builder's indemnification obligations, and the Owner shall indemnify and hold harmless the Design-Builder, its Design-Professional, Subcontractors and consultants, and the agents, officers, directors and employees of each of them, from and against any and all claims, damages, losses, costs and expenses, including reasonable attorneys' fees and costs, arising out of or resulting from such any prohibited use.

2.1.9.5 DESIGN-BUILDER'S USE OF DOCUMENTS Where the Design-Builder has transferred its copyright interest in the Documents under subsection 2.1.9, the Design-Builder may reuse Documents prepared by it pursuant to this Agreement in its practice, but only in their separate constituent parts and not as a whole.

2.1.9.6 The Design-Builder shall obtain from its Design-Professional, Subcontractors and consultants rights and rights of use that correspond to the rights given by the



Design-Builder to the Owner in this Agreement, and the Design-Builder shall provide evidence that such rights have been secured.

## 2.2 GUARANTEED MAXIMUM PRICE (GMP)

2.2.1 GMP PROPOSAL At such time as the Owner and the Design-Builder jointly agree, the Design-Builder shall submit a GMP Proposal in a format acceptable to the Owner. Unless the Parties mutually agree otherwise, the GMP shall be the sum of the estimated Cost of the Work as defined in ARTICLE 7 and the Design-Builder's Fee as defined in ARTICLE 6. The GMP is subject to modification as provided in ARTICLE 8. The Design-Builder does not guarantee any specific line item provided as part of the GMP, but agrees that it will be responsible for paying all costs of completing the Work which exceed the GMP, as may be adjusted in accordance with this Agreement.

2.2.1.1 If the Design-Build documents are not complete at the time the GMP Proposal is submitted to the Owner, the Design-Builder shall provide in the GMP for further development of the Design-Build Documents consistent with the Owner's Program. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which if required, shall be incorporated by Change Order.

2.2.2 BASIS OF GUARANTEED MAXIMUM PRICE The Design-Builder shall include with the GMP Proposal a written statement of its basis, which shall include:

2.2.2.1 A list of the drawings and specifications, including all addenda, which were used in preparation of the GMP Proposal;

2.2.2.2 A list of allowances and a statement of their basis;

2.2.2.3 A list of the assumptions and clarifications made by the Design-Builder in the preparation of the GMP Proposal to supplement the information contained in the drawings and specifications;

2.2.2.4 the Date of Substantial Completion and the Date of Final Completion upon which the proposed GMP is based, and the Schedule of Work upon which the Date of Substantial Completion and the Date of Final Completion is based;

2.2.2.5 A schedule of applicable alternate prices; a GMP Cost Summary;

2.2.2.6 A schedule of applicable unit prices; a GMP Detailed Estimate;

2.2.2.7 A statement of Additional Services (as defined at Article 2.11) included, if any;

2.2.2.8 The time limit for acceptance of the GMP proposal; a Site Utilization Plan;

2.2.2.9 The Design-Builder's contingency as provided in subsection 2.2.7; Design-Builder's Staff Cost Summary;



2.2.2.10 A statement of any work to be self-performed by the Design-Builder; and

2.2.2.11 A statement identifying all patented or copyrighted materials, methods or systems selected by the Design-Builder and incorporated in the Work that are likely to require the payment of royalties or license fees.

2.2.2.12 Costs within the General Conditions/General Requirements cost-category, as well as the Design-Builder Staffing cost-category, shall be handled as Reimbursable, not-to-exceed amounts. All backup/substantiation of such costs shall be included in each monthly Application for Payment.

2.2.3 REVIEW AND ADJUSTMENT TO GMP PROPOSAL The Design-Builder shall meet with the Owner to review the GMP Proposal. If the Owner has any comments relative to the GMP Proposal, or finds any inconsistencies or inaccuracies in the information presented, it shall give prompt written notice of such comments or findings to the Design-Builder, who shall make appropriate adjustments to the GMP, its basis or both.

2.2.4 ACCEPTANCE OF GMP PROPOSAL Upon acceptance by the Owner of the GMP Proposal, the GMP and its basis shall be set forth in an Amendment.

2.2.5 FAILURE TO ACCEPT THE GMP PROPOSAL Unless the Owner accepts the GMP Proposal in writing on or before the date specified in the GMP Proposal for such acceptance and so notifies the Design-Builder, the GMP Proposal shall not be effective. If the Owner fails to accept the GMP Proposal, or rejects the GMP Proposal, the Owner shall have the right to:

2.2.5.1 suggest modifications to the GMP Proposal. If such modifications are accepted in writing by Design-Builder, the GMP Proposal shall be deemed accepted in accordance with subsection 2.2.4;

2.2.5.2 Direct the Design-Builder to proceed on the basis of reimbursement as provided in ARTICLE 6 and ARTICLE 7 without a GMP, in which case all references in this Agreement to the GMP shall not be applicable; or

2.2.5.3 Terminate the Agreement for convenience. In the absence of a GMP the Parties may establish a Date of Substantial Completion and a Date of Final Completion.

2.2.5.4 Direct the Design-Builder, without additional charge to the Owner, to revise and modify the Contract Documents as necessary to achieve compliance with the construction budget established by the Parties.

2.2.6 PRE-GMP WORK Prior to the Owner's acceptance of the GMP Proposal, the Design-Builder shall not incur any cost to be reimbursed as part of the Cost of the Work, except as provided in this Agreement or as the Owner may specifically authorize in writing.



2.2.7 DESIGN-BUILDER'S CONTINGENCY The GMP Proposal will contain, as part of the estimated Cost of the Work, the Design-Builder's Contingency, a sum mutually agreed upon and monitored by the Design-Builder and the Owner to cover costs which are properly reimbursable as a Cost of the Work but are not the basis for a Change Order. The Owner acknowledges that the estimating process is not exact and the Design-Builder's contingency is intended to cover inaccuracies in the quantities and prices in the estimate, and unanticipated items which may not have been taken into account in the establishment of the GMP, including, but not limited to, (a) unfavorable bidding from trade contractors due to market conditions, price increases, lack of competition and other variables; (b) default by the Design-Builder's subcontractors or suppliers; (c) costs of corrective work not provided for elsewhere; (d) labor disputes; and (e) other conditions which result in an increase in the Cost of the Work, without increasing the GMP. The Design-Builder's Construction Contingency shall *not* be used to cover: changes to the work; design revisions or problems; interference of the Owner, Professional or third parties for which the Design-Builder is not responsible; matters related to land use proceedings; allowance adjustments; unusually severe weather; or items for which the Design-Builder is not responsible.

The Design-Builder may use the funds available in the Construction Contingency for any purpose required to provide and complete the Work within the original Guaranteed Maximum Price Scope of Work due the Owner. Adjustments to various Trade Contract items may be made with funds from the Construction Contingency. The Design-Builder shall provide prior notification for all uses of Construction Contingency in excess of \$XXXXXX and a report itemizing all Construction Contingency usage, including required backup based upon the cost of the Work provisions in ARTICLE 7, for the prior month shall be provided for review by the Owner prior to submitting each monthly application for payment.

2.2.8 COST REPORTING The Design-Builder shall keep such full and detailed accounts as are necessary for proper financial management under this Agreement. The Design-Builder shall maintain a complete set of all books and records prepared or used by the Design-Builder with respect to the Project. The Design-Builder's records supporting its performance and billings under this Agreement shall be current, complete and accurate and maintained according to Generally Accepted Accounting Principles. The Owner shall be afforded reasonable access during normal business hours to all the Design-Builder's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda and similar data relating to this Agreement. The Design-Builder shall preserve all such records for a period of three years after the final payment or longer where required by law. Please refer to Right to Audit provisions in Article 13.

## 2.3 CONSTRUCTION PHASE SERVICES

2.3.1 The Construction Phase will commence upon the issuance by the Owner of a written notice to proceed with construction. If construction commences prior to execution of the relevant Amendment, the Design-Builder shall prepare for the Owner's written approval a list of the documents that are applicable to the part of the Work which the Owner has authorized, which list shall be included in the Owner's written notice to proceed.



2.3.2 In order to complete the Work, the Design-Builder shall provide all necessary construction supervision, inspection, construction equipment, labor, materials, tools, and subcontracted items.

2.3.3 **COMPLIANCE WITH LAWS** The Design-Builder shall give all notices and comply with all Laws at its own costs. The Design-Builder shall be liable to the Owner for all loss, cost and expense, attributable to any acts or omissions by the Design-Builder, its employees, Subcontractors, and agents resulting from the failure to comply with Laws, including, fines, penalties or corrective measures. However, liability under this subsection shall not apply if notice to the Owner was given, and advance approval by appropriate authorities, including the Owner, is received.

2.3.3.1 **CHANGES IN LAW** In the event of any changes in Laws, including taxes, which were not reasonably anticipated and then enacted after either the date of this Agreement or the date a GMP Proposal is accepted by the Owner and set forth in an Amendment to this Agreement, whichever occurs later, the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, shall be equitably adjusted by Amendment.

2.3.4 The Design-Builder shall obtain and the Owner shall pay for the building permits necessary for the construction of the Project unless otherwise agreed to by the Parties.

2.3.5 The Design-Builder shall provide periodic written reports to the Owner on the progress of the Work in such detail as is required by the Owner and as agreed to by the Owner and the Design-Builder.

2.3.6 The Design-Builder shall develop a system of cost reporting for the Work, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes in the Work. The reports shall be presented to the Owner at mutually agreeable intervals.

2.3.7 The Design-Builder shall regularly remove debris and waste materials at the Worksite resulting from the Work. Prior to discontinuing Work in an area, the Design-Builder shall clean the area and remove all rubbish and its construction equipment, tools, machinery, waste and surplus materials. The Design-Builder shall minimize and confine dust and debris resulting from construction activities. At the completion of the Work, the Design-Builder shall remove from the Worksite all construction equipment, tools, surplus materials, waste materials and debris.

The Design-Builder shall prepare and submit to the Owner, within 30 days after substantial completion, a full set of as-built drawings, compatible with the Owner's CADD system, which shall become the record drawings for the Project. The as-built drawings shall generally document how the various elements of the Work, including changes, were actually constructed or installed.



2.4 SCHEDULE OF THE WORK The Design-Builder shall prepare and submit a schedule of work for the Owner's acceptance and written approval as to milestone dates. This schedule shall indicate the commencement and completion dates of the various stages of the Work, including the dates when information and approvals are required from the Owner. The schedule shall be revised as required by the conditions of the Work.

## 2.5 SAFETY OF PERSONS AND PROPERTY

2.5.1 SAFETY PRECAUTIONS AND PROGRAMS The Design-Builder shall have overall responsibility for safety precautions and programs in the performance of the Work. However, such obligation does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with the provisions of Laws.

Design-Builder and each Trade Contractor shall be obligated to adhere to the safety requirements as outlined in the following: Construction Safety Requirements, The Pennsylvania State University, Office of Physical Plant, Design and Construction Standards, Division 00, Sub-Section 00 01 00.

[\(\[http://legacy.opp.psu.edu/planning-construction/design\\\_and\\\_construction\\\_standards/documents/PSU-OPP-Contractor-Safety-Requirements\]\(http://legacy.opp.psu.edu/planning-construction/design\_and\_construction\_standards/documents/PSU-OPP-Contractor-Safety-Requirements\)\)](http://legacy.opp.psu.edu/planning-construction/design_and_construction_standards/documents/PSU-OPP-Contractor-Safety-Requirements)

2.5.2 The Design-Builder shall seek to avoid injury, loss or damage to persons or property by taking reasonable steps to protect:

2.5.2.1 its employees and other persons at the Worksite;

2.5.2.2 materials, supplies and equipment stored at the Worksite for use in performance of the Work; and

2.5.2.3 the Project and all property located at the Worksite and adjacent to work areas, whether or not said property or structures are part of the Project or involved in the Work.

2.5.3 DESIGN-BUILDER'S SAFETY REPRESENTATIVE The Design-Builder shall designate an individual at the Worksite in the employ of the Design-Builder who shall act as the Design-Builder's designated safety representative with a duty to prevent accidents. Unless otherwise identified by the Design-Builder in writing to the Owner, the designated safety representative shall be the Design-Builder's project superintendent. The Design-Builder will report promptly in writing all recordable accidents and injuries occurring at the Worksite to the Owner. When the Design-Builder is required to file an accident report with a public authority, the Design-Builder shall furnish a copy of the report to the Owner.

2.5.4 The Design-Builder shall provide the Owner with copies of all notices required of the Design-Builder by Law. The Design-Builder's safety program shall comply with the



requirements of governmental and quasi-governmental authorities having jurisdiction over the Work.

2.5.5 Damage or loss not insured under property insurance that arises from the performance of the Work, to the extent of the negligence attributed to such acts or omissions of the Design-Builder, or anyone for whose acts the Design-Builder may be liable, shall be promptly remedied by the Design-Builder. Damage or loss attributable to the acts or omissions of the Owner or Others and not to the Design-Builder shall be promptly remedied by the Owner.

2.5.6 If the Owner reasonably deems any part of the Work or Worksite unsafe, the Owner, without assuming responsibility for the Design-Builder's safety program or compliance with same, may require the Design-Builder to stop performance of the Work or take corrective measures satisfactory to the Owner, or both. If the Design-Builder does not adopt corrective measures, the Owner may perform them and reduce by the costs of the corrective measures the amount of the GMP, or in the absence of a GMP, the Cost of the Work as provided in ARTICLE 7. The Design-Builder agrees to make no claim for damages, for an increase in the GMP, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion based on the Design-Builder's compliance with the Owner's reasonable request.

2.6 EMERGENCIES In any emergency affecting the safety of persons or property, the Design-Builder shall act in a reasonable manner to prevent threatened damage, injury or loss. Any change in the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, on account of emergency work shall be determined as provided for in ARTICLE 8.

## 2.7 HAZARDOUS MATERIALS

2.7.1 A Hazardous Material is any substance or material identified now or in the future as hazardous under any Laws or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing handling, disposal or clean-up. The Design-Builder shall not be obligated to commence or continue work until any Hazardous Material discovered at the Worksite has been removed, or rendered or determined to be harmless by the Owner as certified by an independent testing laboratory and approved by the appropriate governmental agency.

2.7.2 After commencing the Work, if Hazardous Material is discovered at the Project, the Design-Builder shall be entitled to immediately stop Work in the affected area. The Design-Builder shall promptly report the condition to the Owner and, if required, the governmental agency with jurisdiction.

2.7.3 Prior to removal or mitigation, the Design-Builder shall not be required to perform any Work relating to or in the area of Hazardous Material without written mutual agreement.



2.7.4 The Owner shall be responsible for retaining an independent testing laboratory to determine the nature of the material encountered and whether it is a Hazardous Material requiring corrective measures or remedial action. Such measures shall be the sole responsibility of the Owner, and shall be performed in a manner minimizing any adverse effect upon the Work of the Design-Builder. The Design-Builder shall resume Work in the area affected by any Hazardous Material only upon written agreement between the Parties after the Hazardous Material has been removed or rendered harmless and only after approval, if necessary, of the governmental agency or agencies with jurisdiction.

2.7.5 If the Design-Builder incurs additional costs or is delayed due to the presence or remediation of Hazardous Material, the Design-Builder shall be entitled to an equitable adjustment in the GMP, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion.

2.7.6 To the extent permitted under section 5.5 and to the extent not caused by the negligent acts or omissions of the Design-Builder, its Subcontractors, Material Suppliers and Sub-subcontractors, and the agents, officers, directors and employees of each of them, the Owner shall defend, indemnify and hold harmless the Design-Builder, its Subcontractors and Subsubcontractors, and the agents, officers, directors and employees of each of them, from and against all claims, damages, losses, costs and expenses, including but not limited to reasonable attorneys' fees, costs and expenses, arising out of or resulting from the presence, removal or remediation of Hazardous Material at the Site.

2.7.7 Safety Data Sheets (SDS) as required by law and pertaining to materials or substances used or consumed in the performance of the Work, whether obtained by the Design-Builder, Subcontractors, the Owner or Others, shall be maintained at the Project by the Design-Builder and made available to the Owner and Subcontractors.

2.7.8 During the Design-Builder's performance of the Work, the Design-Builder shall be responsible for the proper handling of all materials brought to the Worksite by the Design-Builder. Upon the issuance of the Certificate of Substantial Completion, the Owner shall be responsible under this section for materials and substances brought to the site by the Design-Builder if such materials or substances are required by the Contract Documents.

2.7.9 Section 2.6 shall survive the completion of the Work under this Agreement or any termination of this Agreement.

## 2.8 WARRANTY

2.8.1 The Design-Builder warrants that all materials and equipment furnished under the Construction Phase of this Agreement will be new unless otherwise specified, of good quality, in conformance with the Contract Documents, and free from defective workmanship and materials. Warranties shall commence on the Date of Substantial Completion of the Work or of a designated portion.

2.8.2 To the extent products, equipment, systems or materials incorporated in the Work are specified and purchased by the Owner, they shall be covered exclusively by the warranty of



the manufacturer. There are no warranties which extend beyond the description on the face of any such warranty. To the extent products, equipment, systems or materials incorporated in the Work are specified by the Owner but purchased by the Design-Builder and are inconsistent with selection criteria that otherwise would have been followed by the Design-Builder, the Design-Builder shall assist the Owner in pursuing warranty claims. Nothing in this section is intended to limit any manufacturer's warranty which provides Owner with greater warranty rights than set forth herein or in the Contract Documents

2.8.3 The Design-Builder shall secure required certificates of inspection, testing or approval and deliver them to the Owner.

2.8.4 The Design-Builder shall collect all written warranties and equipment manuals and deliver them to the Owner in a format directed by the Owner.

2.8.5 With the assistance of the Owner's maintenance personnel, the Design-Builder shall direct the checkout of utilities and start-up operations, and adjusting and balancing of systems and equipment for readiness.

## 2.9 CORRECTION OF WORK WITHIN ONE YEAR

2.9.1 If, prior to Substantial Completion and within one year after the date of Substantial Completion of the Work or for such longer periods of time as may be set forth with respect to specific warranties required by the Contract Documents, any Defective Work is found, the Owner shall promptly notify the Design-Builder in writing. Unless the Owner provides written acceptance of the condition, the Design-Builder shall promptly correct the Defective Work at its own cost and time and bear the expense of additional services required for correction of any Defective Work for which it is responsible. If within the one-year correction period the Owner actually discovers and does not notify the Design-Builder or give the Design-Builder an opportunity to test or correct Defective Work as reasonably requested by the Design-Builder, the Owner waives the Design-Builder's obligation to correct that Defective Work as well as the Owner's right to claim a breach of the warranty with respect to that Defective Work.

2.9.2 With respect to any portion of Work first performed after Substantial Completion, the one-year correction period shall be extended by the period of time between Substantial Completion and the actual performance of the later Work. Correction periods shall not be extended by corrective work performed by the Design-Builder.

2.9.3 If the Design-Builder fails to correct Defective Work within a reasonable time after receipt of written notice from the Owner prior to final payment, the Owner may correct it in accordance with the Owner's right to carry out the Work. In such case, an appropriate Change Order shall be issued deducting the cost of correcting the Defective Work from payments then or thereafter due the Design-Builder. If payments then or thereafter due the Design-Builder are not sufficient to cover such amounts, the Design-Builder shall pay the difference to the Owner.



2.9.4 The Design-Builder's obligations and liability, if any, with respect to any Defective Work discovered after the one-year correction period shall be determined by the Law. If, after the one-year correction period but before the applicable limitation period has expired, the Owner discovers any Work which the Owner considers Defective Work, the Owner shall, unless the Defective Work requires emergency correction, notify the Design-Builder and allow the Design-Builder an opportunity to correct the Work if the Design-Builder elects to do so. If the Design-Builder elects to correct the Work, it shall provide written notice of such intent within fourteen (14) Days of its receipt of notice from the Owner and shall complete the correction of Work within a mutually agreed timeframe. If the Design-Builder does not elect to correct the Work, the Owner may have the Work corrected by itself or Others, and, if the Owner intends to seek recovery of those costs from the Design-Builder, the Owner shall promptly provide the Design-Builder with an accounting of correction costs it incurs.

2.9.5 If the Design-Builder's correction or removal of Defective Work causes damage to or destroys other completed or partially completed Work or existing buildings, the Design-Builder shall be responsible for the cost of correcting the destroyed or damaged property.

2.9.6 The one-year period for correction of Defective Work does not constitute a limitation period with respect to the enforcement of the Design-Builder's obligations under the Contract Documents.

2.9.7 Prior to final payment, at the Owner's option and with the Design-Builder's agreement, the Owner may elect to accept Defective Work rather than require its removal and correction. In such case the Contract Price shall be equitably adjusted for any diminution in the value of the Project caused by such Defective Work.

2.10 CONFIDENTIALITY Unless compelled by law, a governmental agency or authority, an order of a court of competent jurisdiction, or a validly issued subpoena, the Design-Builder shall treat as confidential and not disclose to third-persons, except Subcontractors, Subsubcontractors and the Design-Professional as is necessary for the performance of the Work, or use for its own benefit any of the Owner's developments, confidential information, know-how, discoveries, production methods and the like that may be disclosed to the Design-Builder or which the Design-Builder may acquire in connection with the Work. The Owner shall treat as confidential information all of the Design-Builder's estimating systems and historical and parameter cost data that may be disclosed to the Owner in connection with the performance of this Agreement. The Owner and the Design-Builder shall each specify those items to be treated as confidential and shall mark them as "Confidential." In the event of a legal compulsion or other order seeking disclosure of any Confidential Information, the Design-Builder or Owner, as the case may be, shall promptly notify the other party to permit that party's legal objection, if necessary. Disclosures required by Owner pursuant to Law, including but not limited to Pennsylvania's Right to Know Law, shall not require advance notice to, nor approval by Design-Builder.

2.11 ADDITIONAL SERVICES The Design-Builder shall provide or procure the following Additional Services upon the request of the Owner. A written agreement between the Owner and the Design-Builder shall define the extent of such Additional Services before they are performed by the Design-Builder. If a GMP has been established for the Work or any portion



of the Work, such Additional Services shall be considered a Change in the Work, unless they are specifically included in the statement of the basis of the GMP as set forth in an Amendment.

2.11.1 Development of the Owner's Program, establishing the Project budget, investigating sources of financing, general business planning and other information and documentation as may be required to establish the feasibility of the Project.

2.11.2 Consultations, negotiations, and documentation supporting the procurement of Project financing.

2.11.3 Surveys, site evaluations, legal descriptions and aerial photographs.

2.11.4 Appraisals of existing equipment, existing properties, new equipment and developed properties.

2.11.5 Soils, subsurface and environmental studies, reports and investigations required for submission to governmental authorities or others having jurisdiction over the Project.

2.11.6 Consultations and representations before governmental authorities or others having jurisdiction over the Project other than normal assistance in securing building permits.

2.11.7 Investigation or making measured drawings of existing conditions or the reasonably required verification of the Owner-provided drawings and information.

2.11.8 Artistic renderings, models and mockups of the Project or any part of the Project or the Work.

2.11.9 Inventories of existing furniture, fixtures, furnishings and equipment which might be under consideration for incorporation into the Work.

2.11.10 Interior design and related services, including procurement and placement of furniture, furnishings, artwork and decorations.

2.11.11 Making revisions to the Schematic Design, Design Development, Construction Documents or documents forming the basis of the GMP after they have been approved by the Owner, and which are due to causes beyond the control of the Design-Builder. Causes beyond the control of the Design-Builder do not include acts or omissions on the part of Subcontractors, Material Suppliers, Subsubcontractors or the Design-Professional.

2.11.12 Design, coordination, management, expediting and other services supporting the procurement of materials to be obtained, or work to be performed, by the Owner, including but not limited to telephone systems, computer wiring networks, sound



systems, alarms, security systems and other specialty systems which are not a part of the Work.

2.11.13 Estimates, proposals, appraisals, consultations, negotiations and services in connection with the repair or replacement of an insured loss, provided such repair or replacement did not result from the negligence or failure to comply with the Contract Documents of the Design-Builder, or any Subcontractor or Subsubcontractor

2.11.14 The premium portion of overtime work ordered by the Owner, including productivity impact costs, other than that required by the Design-Builder to maintain the Schedule of Work.

2.11.15 Out-of-town travel by the Design-Professional in connection with the Work, except between the Design-Professional's office, the Design-Builder's office, the Owner's office and the Worksite.

2.11.16 Obtaining service contractors and training maintenance personnel, assisting and consulting in the use of systems and equipment after the initial start-up.

2.11.17 Services for tenant or rental spaces not a part of this Agreement.

2.11.18 Services requested by the Owner or required by the Work which are not specified in the Contract Documents and which are not normally part of generally accepted design and construction practice.

2.11.19 Serving or preparing to serve as an expert consultant or witness in connection with any proceeding, legal or otherwise, regarding the Project; provided, however, that Design-Builder shall provide such services free of charge in the event that the proceeding in question arose from, or is alleged to have arisen from, in whole in part, any action or inaction of Design-Builder.

2.11.20 Document reproduction exceeding the limits provided for in this Agreement.

2.11.21 Providing services relating to Hazardous Material discovered at the Worksite.

2.11.22 Other services as agreed to by the Parties and identified in an attached exhibit.

2.12 DESIGN-BUILDER'S REPRESENTATIVE The Design-Builder shall designate a person who shall be the Design-Builder's representative. The Design-Builder's Representative is **XXXXXXXXXX**.

## ARTICLE 3 OWNER'S RESPONSIBILITIES

3.1 INFORMATION AND SERVICES PROVIDED BY OWNER Owner's responsibilities under this article shall be fulfilled with reasonable detail and in a timely manner.



3.2 FINANCIAL INFORMATION At Design-Builder's request, the Owner shall provide the Design-Builder evidence of Project financing.

3.3 WORKSITE INFORMATION To the extent the Owner has obtained, or is required elsewhere in the Contract Documents to obtain, the following Worksite information, and to the extent relevant to the Work, the Owner shall provide at the Owner's expense and with reasonable promptness:

3.3.1 information describing the physical characteristics of the site, including surveys, Worksite evaluations, legal descriptions, data or drawings depicting existing conditions, subsurface conditions and environmental studies, reports and investigations; Legal descriptions shall include easements, title restrictions, boundaries, and zoning restrictions. Worksite descriptions shall include existing buildings and other construction and all other pertinent site conditions. Adjacent property descriptions shall include structures, streets, sidewalks, alleys, and other features relevant to the Work. Utility details shall include available services, lines at the Worksite and adjacent thereto and connection points. The information shall include public and private information, subsurface information, grades, contours, and elevations, drainage data, exact locations and dimensions, and benchmarks that can be used by the Design-Builder in laying out the Work.

3.3.2 tests, inspections and other reports dealing with environmental matters, Hazardous Material and other existing conditions, including structural, mechanical and chemical tests, required by the Contract Documents or by Law; and

3.3.3 any other information or services requested in writing by the Design-Builder which are required for the Design-Builder's performance of the Work and under the Owner's control.

### 3.4 RESPONSIBILITIES DURING DESIGN PHASE

3.4.1 The Owner shall provide the Owner's Program at the inception of the Design Phase and shall review and timely approve in writing schedules, estimates, Preliminary Estimate, Schematic Design Documents, Design Development Documents and Construction Documents furnished during the Design Phase, and the GMP Proposal.

### 3.5 RESPONSIBILITIES DURING CONSTRUCTION PHASE

3.5.1 The Owner shall review the Schedule of the Work as and timely approve the milestone dates set forth.

3.5.2 If the Owner becomes aware of any error, omission or failure to meet the requirements of the Contract Documents or any fault or defect in the Work, the Owner shall give prompt written notice to the Design-Builder. The failure of the Owner to give such notice shall not relieve the Design-Builder of its obligations to fulfill the requirements of the Contract Documents.

3.5.3 The Owner shall have no contractual obligations to Subcontractors, suppliers, or the Design-Professional.



3.5.4 The Owner shall provide insurance for the Project as provided in ARTICLE 15.

3.6 OWNER'S REPRESENTATIVE The Owner's Representative is **XXXXXXXXXX**. The Owner's representative shall: (a) be fully acquainted with the Project; (b) agree to furnish the information and services required of the Owner in a timely manner; and (c) have the authority to bind the Owner in all matters requiring the Owner's approval, authorization or written notice. If the Owner changes its representative or the representative's authority as listed above, the Owner shall notify the Design-Builder in writing in advance.

3.7 TAX EXEMPTION If in accordance with the Owner's direction the Design-Builder claims an exemption for taxes, the Owner shall indemnify and hold the Design-Builder harmless for all liability, penalty, interest, fine, tax assessment, attorneys' fees or other expense or cost incurred by the Design-Builder as a result of any action taken by the Design-Builder in accordance with the Owner's direction.

3.8 ELECTRONIC DOCUMENTS If the Owner requires that the Owner and Design-Builder exchange documents and data in electronic or digital form, prior to any such exchange, the Owner and the Design-Builder shall agree on a written protocol governing all exchanges in a separate addenda, which, at a minimum, shall specify: (a) the definition of documents and data to be accepted in electronic or digital form or to be transmitted electronically or digitally; (b) management and coordination responsibilities; (c) necessary equipment, software and services; (d) acceptable formats, transmission methods and verification procedures; (e) methods for maintaining version control; (f) privacy and security requirements; and (g) storage and retrieval requirements. The Parties shall each bear their own costs for the requirements identified in the protocol. In the absence of a written protocol, use of documents and data in electronic or digital form shall be at the sole risk of the recipient.

## ARTICLE 4 SUBCONTRACTS

Work not performed by the Design-Builder with its own forces shall be performed by Subcontractors or the Design-Professional. Self-performed work must be agreed to, in writing, by the Parties.

4.1 RETAINING SUBCONTRACTORS Design-Builder shall employ only Subcontractors who are duly licensed and qualified to perform the Work consistent with the Contract Documents. All trade contractors must be prequalified for the project by the Design-Builder. Owner may reasonably object to Design-Builder's selection of any Subcontractor, provided that the Contract Price and/or Contract Time(s) shall be adjusted to the extent that Owner's decision impacts Design-Builder's cost and/or time of performance. All subcontracts must be competitively procured. Procurement of subcontracts must be coordinated directly with The Pennsylvania State University Office of Physical Plant.

Subcontracts: Subcontracts will be awarded after consultation with the Owner. Design-Builder shall have final authority and responsibility for selection of all Subcontractors and award of all Subcontracts.



Design-Builder hereby specifically agrees to indemnify, defend and hold harmless the Owner and Owner's agents, employees, trustees and attorneys for any and all loss, damage, cost, charge, award, verdict, judgment, liability or expense, including without limitation, reasonable attorneys' fees, arising out of any claim, actions or suits which are based upon or in any way related to the process of selecting Subcontractors or the award of Subcontracts for the project.

The Design-Builder agrees to bind every Subcontractor, and every Subcontractor agrees to be bound, by the terms of the Agreement and the Contract Documents insofar as they are applicable to the Subcontractor's respective portion of the Work. The Design-Builder shall indemnify the Owner for any Subcontractor's claim which may result from the failure of the Design-Builder to incorporate the provisions of this Contract, in the Design-Builder's agreements with any of its Subcontractors.

The Design-Builder shall indemnify the Owner for any Subcontractor's claim which may arise out of an inconsistency between the Contract Documents and a Subcontract. Subcontracts entered into between the Design-Builder and Subcontractors shall not be inconsistent with the obligations of the Design-Builder under the Contract Documents.

4.2 MANAGEMENT OF SUBCONTRACTORS The Design-Builder shall be responsible for the management of the Subcontractors in the performance of their work.

#### 4.3 CONTINGENT ASSIGNMENT OF SUBCONTRACT

4.3.1 If this Agreement is terminated, each subcontract agreement shall be assigned by the Design-Builder to the Owner, subject to the prior rights of any surety, provided that:

4.3.1.1 this Agreement is terminated by the Owner pursuant to sections 11.1.3 or 11.2; and

4.3.1.2 the Owner accepts such assignment, after termination by notifying the Subcontractor and the Design-Builder in writing, and assumes all rights and obligations of the Design-Builder pursuant to each subcontract agreement.

4.3.2 If the Owner accepts such an assignment, and the Work has been suspended for more than thirty (30) consecutive Days, following termination, if appropriate, the Subcontractor's compensation shall be equitably adjusted as a result of the suspension.

4.4 BINDING OF SUBCONTRACTORS AND MATERIAL SUPPLIERS The Design-Builder agrees to bind every Subcontractor and Material Supplier (and require every Subcontractor to so bind its Subsubcontractors and Material Suppliers) to all the provisions of this Agreement and the Contract Documents as they apply to the Subcontractors' or Material Suppliers' portions of the Work.

4.5 The Parties have executed a Waiver of Liens / Stipulation Against Liens Agreement, and Design-Builder has purchased (or will have, at the the time that the GMP is established) a payment bond which shall serve as a guarantee of payment for the work, services, labor, materials and/or equipment provided by any and all Subcontractors (as used in this paragraph, "Subcontractors" includes "Subsubcontractors") and Material Suppliers. Design-Builder hereby



specifically waives all lien rights of Subcontractors and Material Suppliers, per the Pennsylvania Mechanics' Lien Law of 1963, as amended. Design-Builder hereby covenants, promises and agrees that no mechanics' or materialsmen's lien or claim, or any other lien or claim, will be filed or maintained on the Worksite, or any grounds or curtilages appurtenant thereto, or any other structure or property owned by the Owner, either by Design-Builder or any Subcontractor or Material Supplier, for or on account of any work, labor or materials supplied by any Subcontractor or Material Supplier in the performance of this Agreement, or under any supplemental contract for extra work, in the erection, construction or completion of the improvements to the Project or the Worksite. Nothing herein may be construed as agreement or admission by Owner that a lien filed on or against property of Owner, a State-Related Institution and Instrumentality of the Commonwealth of Pennsylvania, is valid or permissible under any circumstances per Pennsylvania law.

## ARTICLE 5 TIME

5.1 DATE OF COMMENCEMENT The Date of Commencement is the date of the Agreement unless otherwise set forth below:

The Work shall proceed in general accordance with the approved schedule of Work as such schedule may be amended from time to time, subject, however, to other provisions of this Agreement.

The Work to be provided under this Agreement shall be in accordance with the following schedule:

|                         |            |
|-------------------------|------------|
| Start of Construction:  | XXXXXXXXXX |
| Substantial Completion: | XXXXXXXXXX |
| Final Completion:       | XXXXXXXXXX |

5.2 SUBSTANTIAL/FINAL COMPLETION Unless the Parties agree otherwise, the Date of Substantial Completion or the Date of Final Completion shall be established in an Amendment to this Agreement subject to adjustments as provided for in the Contract Documents. The Owner and the Design-Builder may agree not to establish such dates, or in the alternative, to establish one but not the other of the two dates. If such dates are not established upon the execution of this Agreement, at such time as a GMP is accepted a Date of Substantial Completion or Date of Final Completion of the Work shall be established in an Amendment. If a GMP is not established and the Parties desire to establish a Date of Substantial Completion or Date of Final Completion, it shall be set forth in an Amendment.

5.2.1 The deadlines for Substantial and Final Completion are subject to adjustments as provided for in the Contract Documents.

5.2.2 Time is of the essence for this Agreement and the Contract Documents.



5.2.3 Unless instructed by the Owner in writing, the Design-Builder shall not knowingly commence the Work before the effective date of insurance to be provided by the Design-Builder or the Owner as required by the Contract Documents.

### 5.3 DELAYS AND EXTENSIONS OF TIME

5.3.1 If the Design-Builder is delayed at any time in the commencement or progress of the Work by any cause beyond the control of the Design-Builder, the Design-Builder shall be entitled to an equitable extension of the Date of Substantial Completion or the Date of Final Completion. Examples of causes beyond the control of the Design-Builder include, but are not limited to, the following: (a) acts or omissions of the Owner or Others; (b) changes in the Work or the sequencing of the Work ordered by the Owner, or arising from decisions of the Owner that impact the time of performance of the Work; (c) encountering Hazardous Materials unanticipated by the Design-Builder, or concealed or unknown conditions; (d) delay authorized by the Owner pending dispute resolution or suspension by the Owner under section ARTICLE 11; (e) transportation delays not reasonably foreseeable; (f) labor disputes not involving the Design-Builder; (g) general labor disputes impacting the Project but not specifically related to the Worksite; (h) fire; (i) Terrorism; (j) epidemics, (k) adverse governmental actions, (l) unavoidable accidents or circumstances; (m) severe and extreme adverse weather conditions not reasonably anticipated. The Design-Builder shall process any requests for equitable extensions of the Date of Substantial Completion or the Date of Final Completion in accordance with the provisions of ARTICLE 8.

5.3.2 Delays caused by failure of performance by Subcontractors, Subsubcontractors, or Material Suppliers shall not be grounds for any extension of the Date of Substantial Completion nor any equitable adjustment to the GMP.

5.3.3 In addition, if the Design-Builder incurs additional costs as a result of a delay that is caused by items (a) through (m) immediately above, the Design-Builder shall be entitled to an equitable adjustment in the GMP subject to section 5.5.

5.3.4 If delays to the Project are encountered for any reason, the Parties agree to take reasonable steps to mitigate the effect of such delays.

### 5.4 LIQUIDATED DAMAGES

5.4.1 **SUBSTANTIAL COMPLETION** The Owner and the Design-Builder agree that this Agreement shall not provide for the imposition of liquidated damages at this time and **will/may** be determined at a later date by the Parties.

5.4.1.1 The Design-Builder understands that if the Date of Substantial Completion established by an Amendment, as may be amended by subsequent Change Order, is not attained, the Owner will suffer damages which are difficult to determine and accurately specify. The Design-Builder agrees that if the Date of Substantial Completion is not attained, the Design-Builder shall pay the Owner TBD dollars (\$TBD) as liquidated damages and not as a penalty for each Day that Substantial Completion extends beyond the Date of Substantial Completion. The liquidated



damages provided herein shall be in lieu of all liability for any and all extra costs, losses, expenses, claims, penalties and any other damages of whatsoever nature incurred by the Owner which are occasioned by any delay in achieving the Date of Substantial Completion. If Liquidated Damages are not established or otherwise addressed by the Parties, the Owner reserves the right to assess Actual Damages incurred.

5.4.2 FINAL COMPLETION The Owner and the Design-Builder agree that this Agreement shall not provide for the imposition of liquidated damages based on the Date of Final Completion at this time.

5.4.3 The Design-Builder understands that if the Date of Final Completion established by an Amendment is not attained, the Owner will suffer damages which are difficult to determine and accurately specify. The Design-Builder agrees that if the Date of Final Completion is not attained, the Design-Builder shall pay the Owner TBD dollars (\$TBD) as liquidated damages for each Day that Final Completion extends beyond the Date of Final Completion. The liquidated damages provided herein shall be in lieu of all liability for any and all extra costs, losses, expenses, claims, penalties and any other damages of whatsoever nature incurred by the Owner which are occasioned by any delay in achieving the Date of Final Completion.

5.4.4 OTHER LIQUIDATED DAMAGES The Owner and the Design-Builder may agree upon the imposition of liquidated damages based on other project milestones or performance requirements. Such agreement shall be included as an exhibit to this Agreement.

5.5 LIMITED MUTUAL WAIVER OF CONSEQUENTIAL DAMAGES Except for damages mutually agreed upon by the Parties as liquidated damages in section 5.4 and excluding losses covered by insurance required by the Contract Documents, the Owner and the Design-Builder agree to waive all claims against each other for any consequential damages that may arise out of or relate to this Agreement, except for those specific items of damages excluded from this waiver as mutually agreed upon by the Parties and identified below. The Owner agrees to waive damages including but not limited to the Owner's loss of use of the Project, any rental expenses incurred, loss of income, profit or financing related to the Project, as well as the loss of business, loss of financing, principal office overhead and expenses, loss of profits not related to this Project, loss of reputation, or insolvency. The Design-Builder agrees to waive damages including but not limited to loss of business, loss of financing, loss of profits not related to this Project, loss of bonding capacity, loss of reputation, or insolvency. The provisions of this section shall also apply to the termination of this Agreement and shall survive such termination.

5.5.1 The Owner and the Design-Builder shall require similar waivers in contracts with Subcontractors and Others retained for the Project.

## ARTICLE 6 COMPENSATION

### 6.1 DESIGN PHASE COMPENSATION

6.1.1 To the extent required by Law, the cost of services performed directly by the Design-Professional is computed separately and is independent from the Design-Builder's



compensation for work or services performed directly by the Design-Builder; these costs shall be shown as separate items on applications for payment. If any Design-Professional is retained by the Design-Builder, the payments to the Design-Professional shall be as detailed in a separate agreement between the Design-Builder and the Design-Professional.

6.1.2 The Owner shall compensate the Design-Builder for services performed during the Design Phase, including pre-construction services and preparation of a GMP Proposal, if applicable, as follows: the sum of **XX** Dollars (\$ **XXXXXXXX**).

6.1.3 Compensation for Design Phase services, as part of the Work, shall include the Design-Builder's Fee, paid in proportion to the services performed, subject to adjustment.

6.1.4 Within fifteen (15) Days after receipt of each monthly application for payment, the Owner shall give written notice to the Design-Builder of the Owner's acceptance or rejection, in whole or in part, of such application for payment. Within forty-five (45) Days after accepting such application, the Owner shall pay directly to the Design-Builder the appropriate amount for which application for payment is made, less amounts previously paid by the Owner. If such application is rejected in whole or in part, the Owner shall indicate the reasons for its rejection. If the Owner and the Design-Builder cannot agree on a revised amount then, within fifteen (15) Days after its initial rejection in part of such application, the Owner shall pay directly to the Design-Builder the appropriate amount for those items not rejected by the Owner for which application for payment is made, less amounts previously paid by the Owner. Those items rejected by the Owner shall be due and payable when the reasons for the rejection have been removed.

## 6.2 CONSTRUCTION PHASE COMPENSATION

6.2.1 The Owner shall compensate the Design-Builder for Work performed following the commencement of the Construction Phase on the following basis:

6.2.1.1 the Cost of the Work as allowed in ARTICLE 7; and

6.2.1.2 the Design-Builder's Fee paid in proportion to the services performed subject to adjustment.

6.2.2 The compensation to be paid under this section, ARTICLE 6.2 and ARTICLE 6.3, shall be limited to, and shall not exceed, the GMP established in the GMP Amendment, except to the extent that the GMP may be adjusted under ARTICLE 8.

6.2.3 Payment for Construction Phase services shall be as set forth in ARTICLE 9. If Design Phase services continue to be provided after construction has commenced, the Design-Builder shall continue to be compensated as provided in ARTICLE 6, or as mutually agreed.

6.3 DESIGN-BUILDER'S FEE The Design-Builder's Fee Percentage shall be as follows:

The Design-Builder's Fee Percentage shall be **XXXXXXXX** percent (**XX**%).



6.3.1 Markups for Changes: If the GMP requires an adjustment due to changes in the Work, the Design-Builder shall receive the 'Design-Builder's Fee Percentage' of any increase in the GMP as approved by the Owner. Note: Fee shall not apply to self-performed trade contract Work by the Design-Builder.

#### 6.4 REIMBURSABLE EXPENSES FOR THE DESIGN-BUILDER'S DESIGN PHASE AND ALL DESIGN-PROFESSIONAL SERVICES

Reimbursable expenses for the Design-Builder's Design Phase and all Design-Professional services are in addition to compensation for basic and additional services and include those project specific expenses as follows for which the Design-Builder and Design-Professional shall be reimbursed on a not-to-exceed basis for their direct "out-of-pocket" costs (no mark-up allowed on reimbursable expenses by the Design-Professional or related consultants). Reimbursable expenses shall be submitted with supporting documentation, which shall include detailed, itemized receipts. When requested and authorized by the Owner, the following shall be reimbursable:

6.4.1 Any necessary fee or permit payment required and paid to any governing body or authority having jurisdiction over the Project.

6.4.2 Expense of printing and reproductions, framed renderings, physical models and mock-ups, and professional photography for the use of the Owner or Owner approved third parties.

6.4.3 Postage and shipping costs for project material sent or returned to the Owner or Owner approved third parties.

6.4.4 Travel, meals, and lodging expenses for the purpose of Owner meetings or Owner approved meetings with third parties, limited to individuals under the direct employ of the Design-Builder or Design-Professional or their subconsultants and working on the Project. Air travel expenses shall be approved in advance by the Owner. Maximum individual per diem expenses related to travel shall be based on the Owner's allowable per diem for meals and lodging for that location. Alcohol is not reimbursable. Design-Builder and Design-Professional shall use the Owner's hotels when feasible.

6.4.5 Expenses of specialized consultants identified as optional additional services in Article 3 of this Agreement.

6.4.6 Other project specific expenses requested and authorized by the Owner.

## ARTICLE 7 COST OF THE WORK



The Owner agrees to pay the Design-Builder for the Cost of the Work as defined in this article. This payment shall be in addition to the Design-Builder's Fee stipulated in section 6.3.

## 7.1 COST ITEMS FOR DESIGN PHASE SERVICES

7.1.1 Compensation for Design Phase services as provided in section ARTICLE 6.

## 7.2 COST ITEMS FOR CONSTRUCTION PHASE SERVICES

7.2.1 Wages paid for labor in the direct employ of the Design-Builder in the performance of the Work, or under a salary or wage schedule agreed upon by the Owner and the Design-Builder.

7.2.2 Salaries of the Design-Builder's employees when stationed at the field office (or as otherwise approved by the Owner). The rate specified for team members assigned full-time to the project shall be applied for 2080 hours per year, maximum. Billable hours for assigned staff beyond an 8-hour day, or beyond forty(40) hours per week, will not be reimbursed.

7.2.3 Cost of all employee benefits and taxes including but not limited to workers' compensation, unemployment compensation, social security, health, welfare, retirement and other fringe benefits as required by law, labor agreements, or paid under the Design-Builder's standard personnel policy, insofar as such costs are paid to employees of the Design-Builder who are included in the Cost of the Work under subsections 7.2.1 and 7.2.2.

Design-Builder may charge to Owner wages paid by Design-Builder to full time employees for paid leave during the duration of the Project, provided that: (1) the employee is assigned by Design-Builder to devote full time hours to the Project; and (2) the employee is granted paid leave by Design-Builder for reasons of vacation, holidays, illness or vacation time (sometimes referred to as Paid Time Off and abbreviated "P.T.O."), pursuant to Design-Builder's regular paid leave policy. For purposes of this section, an employee of Design-Builder shall be considered to be full time if he or she is designated as full time under Design-Builder's personnel policies, but in no event shall an employee be considered to be full time unless he or she is assigned to work at least 35 hours per week to the Project. In no event shall Owner be charged for more than twenty(20) days of paid leave for a given employee during any twelve(12) month period (prorated to match project duration, as appropriate). Establishment of those individuals/positions considered to be full time staff must be agreed to in writing by Owner and Design-Builder prior to issuance of the GMP amendment/change order.

7.2.4 Reasonable transportation, travel, hotel and moving expenses of the Design-Builder's personnel incurred in connection with the Work.

7.2.5 Cost of all materials, supplies and equipment incorporated in the Work, including costs of inspection and testing if not provided by the Owner, transportation, storage and handling.



7.2.6 Payments made by the Design-Builder to Subcontractors for work performed under this Agreement.

7.2.7 Fees and expenses for design services procured or furnished by the Design-Builder except as provided by the Design-Professional and compensated in ARTICLE 6.

7.2.8 Cost, including transportation and maintenance of all materials, supplies, equipment, temporary facilities and hand tools not owned by the workers that are used or consumed in the performance of the Work, less salvage value or residual value; and cost less salvage value on such items used, but not consumed that remain the property of the Design-Builder.

7.2.9 Rental charges of all necessary machinery and equipment, exclusive of hand tools owned by workers, used at the Worksite, whether rented from the Design-Builder or Others, including installation, repair and replacement, dismantling, removal, maintenance, transportation and delivery costs. Rental from unrelated third-parties shall be reimbursed at actual cost. Rentals from the Design-Builder or its affiliates, subsidiaries or related parties shall be reimbursed at the prevailing rates in the locality of the Worksite up to eighty-five percent (85%) of the value of the piece of equipment.

7.2.10 Cost of the premiums for all insurance and surety bonds which the Design-Builder is required to procure or deems necessary, and approved by the Owner, including any additional premium incurred as a result of any increase in the GMP, under the terms of Article 15.

7.2.11 Sales, use, gross receipts or other taxes, tariffs or duties related to the Work for which the Design-Builder is liable.

7.2.12 Permits, fees, licenses, tests, and royalties.

7.2.13 Losses, expenses or damages to the extent not compensated by insurance or otherwise, and the cost of corrective work or redesign during the Construction Phase and for a one-year period following the Date of Substantial Completion, provided that such corrective work or redesign did not arise from the Design-Builder's negligence.

7.2.14 All costs associated with establishing, equipping, operating, maintaining and demobilizing the field office.

7.2.15 Reproduction costs, photographs, facsimile transmissions, long-distance telephone calls, data processing services, postage, express delivery charges, data transmission, telephone service, and computer-related costs, to the extent such items are used and consumed in the performance of the Work or are not capable of use after completion of the Work.

7.2.16 All water, power and fuel costs necessary for the Work.

7.2.17 Cost of removal of all non-hazardous substances, debris and waste materials unless otherwise agreed to by the Parties.



7.2.18 Costs incurred due to an emergency affecting the safety of persons or property.

7.2.19 Legal, mediation and arbitration fees and costs, other than those arising from disputes between the Owner and the Design-Builder, or between the Design-Builder and a subcontractor or supplier of the Design-Builder, reasonably and properly resulting from the Design-Builder's performance of the Work.

7.2.20 All costs directly incurred in the performance of the Work or in connection with the Project, and not included in the Design-Builder's Fee as set forth in ARTICLE 6, which are reasonably inferable from the Contract Documents.

7.3 DISCOUNTS All discounts for prompt payment shall accrue to the Owner to the extent such payments are made directly by the Owner. To the extent payments are made with funds of the Design-Builder, all cash discounts shall accrue to the Design-Builder. All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment, shall be credited to the Cost of the Work.

## ARTICLE 8 CHANGES IN THE WORK

Changes in the Work which are within the general scope of this Agreement may be accomplished, without invalidating this Agreement, by Change Order, Interim Directed Change, or a minor change in the work, subject to the limitations stated in the Contract Documents.

### 8.1 CHANGE ORDER

8.1.1 The Design-Builder may request or the Owner, without invalidating this Agreement, may order changes in the Work within the general scope of the Contract Documents consisting of additions, deletions or other revisions to the GMP or the estimated cost of the work, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion being adjusted accordingly. All such changes in the Work shall be authorized by applicable Change Order, and processed in accordance with this article.

8.1.2 Each adjustment in the GMP or estimated Cost of the Work resulting from a Change Order shall clearly separate the amount attributable to compensation for Design Phase services, other Cost of the Work and the Design-Builder's Fee, with the Design-Builder's Fee not to exceed **XXXXX** percent (**XXX%**).

8.1.3 The Owner and the Design-Builder shall negotiate an appropriate adjustment to the GMP or the estimated Cost of the Work, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion in good faith and conclude negotiations as expeditiously as possible. Acceptance of the Change Order and any adjustment in the GMP, the estimated Cost of the Work, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion shall not be unreasonably withheld.



8.1.4 NO OBLIGATION TO PERFORM The Design-Builder shall not be obligated to perform changes in the Work that impacts the GMP or the estimated Cost of the Work, compensation for Design Phase services, the Design-Builder's Fee or the Date of Substantial Completion or the Date of Final Completion until a Change Order has been executed or written Interim Directed Change has been issued.

8.1.5 EFFECT OF AN EXECUTED CHANGE ORDER The Design-Builder, by accepting a Change Order, waives and forever releases, and shall be conclusively barred from asserting, any claim against the Owner for additional time or compensation for matters relating to or arising out of or resulting from the Work included within or affected by the executed Change Order. Any attempt by Design-Builder to preserve any claims relating to or arising out of or resulting from the Work that is the subject of the Change Order, including assertion of the underlying facts as the basis for any sort of claim sounding in delay or lost productivity, shall be disregarded and shall not alter or diminish the preclusive effect of this paragraph.

8.1.6 The Design-Builder shall not include in each request for Change Order any increases in the Design-Builder's costs of insurance, Subguard, or any Design-Builder or subcontractor bonds (collectively, "Bonds"); provided, however, and notwithstanding anything to the contrary in the foregoing, the Design-Builder shall have the right to receive Change Orders increasing the GMP to compensate Design-Builder for increases in the costs of the payment and performance Bonds provided by Design-Builder as and when such increases are required to be paid by Design-Builder to the issuer of such Bonds. Prior to Final Payment the Owner and Design-Builder will determine the amount by which the Design-Builder's costs of insurance, Subguard, and Bonds increased as a result of all Change Orders; and, if such costs have increased, the Design-Builder will be entitled to an adjustment in the GMP by the amount of such increased costs together with the Design-Builder's Fee thereon notwithstanding the provisions of Section 8.1.5 of the Agreement to the contrary.

## 8.2 INTERIM DIRECTED CHANGE

8.2.1 The Owner may issue a written Interim Directed Change directing a change in the Work prior to reaching agreement with the Design-Builder on the adjustment, if any, in the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate, the compensation for Design Phase services.

8.2.2 The Owner and the Design-Builder shall negotiate expeditiously and in good faith for appropriate adjustments, as applicable, to the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, arising out of Interim Directed Change. As the changed Work is completed, the Design-Builder shall submit its costs for such Work with its application for payment beginning with the next application for payment within thirty (30) Days of the issuance of the Interim Directed Change. Pending final determination of cost to the Owner, amounts not in dispute may be included in applications for payment and shall be paid by Owner.



8.2.3 When the Owner and the Design-Builder agree upon the adjustments in the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, for a change in the Work directed by an Interim Directed Change, such agreement shall be the subject of an appropriate Change Order. The Change Order shall include all outstanding Interim Directed Changes on which the Owner and Design-Builder have reached agreement on the GMP or the Date of Substantial Completion or Date of Final Completion issued since the last Change Order.

### 8.3 MINOR CHANGES IN THE WORK

8.3.1 The Design-Builder may make minor changes in the design and construction of the Project consistent with the intent of the Contract Documents which do not involve an adjustment in the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and do not materially and adversely affect the design of the Project, the quality of any of the materials or equipment specified in the Contract Documents, the performance of any materials, equipment or systems specified in the Contract Documents, or the quality of workmanship required by the Contract Documents.

8.3.2 The Design-Builder shall promptly inform the Owner in writing of any such changes and shall record such changes on the Design-Build Documents maintained by the Design-Builder.

8.4 CONCEALED OR UNKNOWN SITE CONDITIONS If the conditions encountered at the Worksite are (a) subsurface or other physical conditions materially different from those indicated in the Contract Documents, or (b) unusual and unknown physical conditions materially different from conditions ordinarily encountered and generally recognized as inherent in Work provided for in the Contract Documents, the Design-Builder shall stop affected Work after the condition is first observed and give prompt written notice of the condition to the Owner and the Design Professional. The Design-Builder shall not be required to perform any Work relating to the unknown condition without the written mutual agreement of the Parties. Any change in the Contract Price or the Contract Time as a result of the unknown condition shall be determined as provided in this article.

### 8.5 DETERMINATION OF COST

8.5.1 An increase or decrease in the GMP or estimated Cost of the Work resulting from a change in the Work shall be determined by one or more of the following methods:

8.5.1.1 unit prices set forth in this Agreement or as subsequently agreed;

8.5.1.2 a mutually accepted, itemized lump sum;

8.5.1.3 costs determined as defined in section 6.2 and ARTICLE 7. The Trade Contractor or Subcontractor actually performing the Work will be allowed a maximum



markup for overhead and profit of 15% on labor only and 10% on material and equipment (not including sales tax). Markup on sales tax is not permitted.

8.5.2 If an increase or decrease in Contract Price or Contract Time cannot be agreed to as set forth in section 8.5.1 above, and the Owner issues an Interim Directed Change, the cost of the change in the Work shall be determined by the reasonable actual expense incurred and savings realized in the performance of the Work resulting from the change. In case of a net decrease in the GMP, the Design-Builder's Fee (lump sum amount) shall not be adjusted unless ten percent (10%) or more of the Project is deleted. The Design-Builder shall maintain a documented, itemized accounting evidencing the expenses and savings.

8.5.3 If unit prices are indicated in the Contract Documents or are subsequently agreed to by the Parties, but the character or quantity of such unit items as originally contemplated is so different in a proposed Change Order that the original unit prices will cause substantial inequity to the Owner or the Design-Builder, such unit prices shall be equitably adjusted.

8.5.4 If the Owner and the Design-Builder disagree as to whether work required by the Owner is within the scope of the Work, the Design-Builder shall furnish the Owner with an estimate of the costs to perform the disputed work in accordance with the Owner's interpretations. If the Owner issues a written order for the Design-Builder to proceed, the Design-Builder shall perform the disputed work and the Owner shall pay the Design-Builder fifty percent (50%) of its actual, direct cost to perform the work. In such event, both Parties reserve their rights as to whether the work was within the scope of the Work. The Owner's payment does not prejudice its right to be reimbursed should it be determined that the disputed work was within the scope of Work. The Design-Builder's receipt of payment for the disputed work does not prejudice its right to receive full payment for the disputed work should it be determined that the disputed work is not within the scope of the Work.

8.6 CLAIMS FOR ADDITIONAL COST OR TIME For any claim for an increase in the GMP, estimated Cost of the Work, the Design-Builder's Fee and the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, the Design-Builder shall give the Owner written notice of the claim within twenty-one (21) Days after the occurrence giving rise to the claim or within twenty-one (21) Days after the Design-Builder first recognizes the condition giving rise to the claim, whichever is later. Except in an emergency, notice shall be given before proceeding with the Work. Claims for design and estimating costs incurred in connection with possible changes requested by the Owner, but which do not proceed, shall be made within twenty-one (21) Days after the decision is made not to proceed. Thereafter, the Design-Builder shall submit written documentation of its claim, including appropriate supporting documentation, within twenty-one (21) Days after giving notice, unless the Parties mutually agree upon a longer period of time. If Design-Builder fails to provide formal, written notice as required in this paragraph within twenty-one (21) days of such occurrence giving rise to the claim, any claim for additional cost or extension of time, including any claims sounding in delay or lost productivity based upon facts or circumstances underlying the claim, shall be deemed waived, barred and forfeited, and Design-Builder shall not be permitted to pursue same pursuant to ARTICLE 12, nor through any other forum or venue. The Owner shall respond in writing denying or approving the Design-Builder's claim no later than twenty-one (21) Days after receipt of the Design-Builder's documentation of claim. Owner's



failure to respond shall be deemed a denial of the Design-Builder's claim. Any change in the GMP, estimated Cost of the Work, the Design-Builder's Fee, the Date of Substantial Completion or the Date of Final Completion, and if appropriate the compensation for Design Phase services, resulting from such claim shall be authorized by Change Order.

8.7 INCIDENTAL CHANGES The Owner may direct the Design-Builder to perform incidental changes in the Work upon concurrence with the Design-Builder that such changes do not involve adjustments in the Cost of the Work or Contract Time. Incidental changes shall be consistent with the scope and intent of the Contract Documents. The Owner shall initiate an incidental change in the Work by issuing a written order to the Design-Builder. Such written notice shall be carried out promptly and is binding on the Parties.

## ARTICLE 9 PAYMENT FOR CONSTRUCTION PHASE SERVICES

### 9.1 PROGRESS PAYMENTS

9.1.1 On a monthly basis after the Construction Phase has commenced, the Design-Builder shall submit to the Owner an application for payment consisting of the Cost of the Work performed up to the end of the month, along with a proportionate share of the Design-Builder's Fee. Prior to submission of the next application for payment, the Design-Builder shall furnish to the Owner a statement accounting for the disbursement of funds received under the previous application. The extent of such statement shall be as agreed upon between the Owner and the Design-Builder. Such monthly applications shall be supported by data substantiating the Contractor's right to payment as the Owner may require, including weekly payroll certification (Commonwealth of Pennsylvania Department of Labor and Industry form LLC-25), Steel Certification form with backup (as applicable), Detailed Cost Breakdown/Schedule of Values, and DBE Utilization data. Payment cannot be processed until this substantiating information is submitted with the monthly application for payment.

9.1.2 Within fifteen (15) Days after receipt of each monthly application for payment, the Owner shall give written notice to the Design-Builder of the Owner's acceptance or rejection, in whole or in part, of such application for payment. Within forty-five (45) Days after approving such application, the Owner shall pay directly to the Design-Builder the appropriate amount for which application for payment is made, less amounts previously paid by the Owner. If such application is rejected in whole or in part, the Owner shall indicate the reasons for its rejection. If the Owner and the Design-Builder cannot agree on a revised amount then, within fifteen (15) Days after its initial rejection in part of such application, the Owner shall pay directly to the Design-Builder the appropriate amount for those items not rejected by the Owner for which application for payment is made, less amounts previously paid by the Owner. Those items rejected by the Owner shall be due and payable when the reasons for the rejection have been removed.

9.1.3 The Design-Builder warrants and guarantees that title to all Work, materials and equipment covered by an application for payment, whether incorporated in the Project or not, will pass to the Owner upon receipt of such payment by the Design-Builder, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to as liens.



9.1.4 The Owner's progress payment, occupancy or use of the Project, whether in whole or in part, shall not be deemed an acceptance of any Work not conforming to the requirements of the Contract Documents.

9.1.5 Upon Substantial Completion of the Work, the Owner shall pay the Design-Builder the unpaid balance of the Cost of the Work, compensation for Design Phase services and the Design-Builder's Fee, less one-hundred-fifty percent (150%) of the cost of completing any unfinished items as agreed to between the Owner and the Design-Builder as to extent and time for completion. The Owner thereafter shall pay the Design-Builder monthly the amount retained for unfinished items as each item is completed.

9.1.6 STORED MATERIALS AND EQUIPMENT Unless otherwise provided in the Contract Documents, applications for payment may include materials and equipment not yet incorporated into the Work but delivered to and suitably stored onsite or offsite, including applicable insurance, storage and costs incurred transporting the materials to an offsite storage facility. Approval of payment applications for stored materials and equipment stored offsite shall be conditioned on submission by the Design-Builder of bills of sale and proof of required insurance, or such other procedures satisfactory to the Owner to establish the proper valuation of the stored materials and equipment, the Owner's title to such materials and equipment, and to otherwise protect the Owner's interests therein, including transportation to the worksite.

9.2 RETAINAGE From each progress payment made prior to the time of Substantial Completion, the Owner may retain Six percent (6%) of the amount otherwise due after deduction of any amounts as provided in section 9.3, and in no event shall such percentage exceed any applicable statutory requirements. Retainage to be held on trade contract/subcontract work only or as agreed otherwise by the Parties. If the Owner chooses to use this retainage provision:

9.2.1 the Owner may, in its sole discretion, reduce the amount to be retained at any time;

9.2.2 the Owner may release retainage on that portion of the Work a Subcontractor has completed, in whole or in part, and which work the Owner has accepted;

9.3 ADJUSTMENT OF DESIGN-BUILDER'S APPLICATION FOR PAYMENT The Owner may adjust or reject an application for payment or nullify a previously approved Design-Builder application for payment, in whole or in part, as may reasonably be necessary to protect the Owner from loss or damage based upon the following, to the extent that the Design-Builder is responsible under this Agreement:

9.3.1 the Design-Builder's repeated failure to perform the Work as required by the Contract Documents;

9.3.2 except as accepted by the insurer providing Builders Risk or other property insurance covering the project, loss or damage arising out of or relating to this Agreement and caused by the Design-Builder to the Owner or Others to whom the Owner may be liable;



9.3.3 the Design-Builder's failure to properly pay the Design-Professional, Subcontractors or Material Suppliers for labor, materials, equipment or supplies furnished in connection with the Work, provided that the Owner is making payments to the Design-Builder in accordance with the terms of this Agreement;

9.3.4 Defective Work not corrected in a timely fashion;

9.3.5 reasonable evidence of delay in performance of the Work such that the Work will not be completed by the Date of Substantial Completion or the Date of Final Completion, and that the unpaid balance of the GMP is not sufficient to offset any direct damages that may be sustained by the Owner as a result of the anticipated delay caused by the Design-Builder;

9.3.6 reasonable evidence demonstrating that the unpaid balance of the GMP is insufficient to fund the cost to complete the Work; and

9.3.7 uninsured third-party claims involving the Design-Builder or reasonable evidence demonstrating that third-party claims are likely to be filed unless and until the Design-Builder furnishes the Owner with adequate security in the form of a surety bond, letter of credit or other collateral or commitment sufficient to discharge such claims if established.

No later than fifteen (15) Days after receipt of an application for payment, the Owner shall give written notice to the Design-Builder, at the time of disapproving or nullifying all or part of an application for payment, stating its specific reasons for such disapproval or nullification, and the remedial actions to be taken by the Design-Builder in order to receive payment. When the above reasons for disapproving or nullifying an application for payment are removed, payment will be promptly made for the amount previously withheld.

#### 9.4 OWNER OCCUPANCY OR USE OF COMPLETED OR PARTIALLY COMPLETED WORK

9.4.1 Portions of the Work that are completed or partially completed may be used or occupied by the Owner when (a) the portion of the Work is designated in a Certificate of Substantial Completion, (b) appropriate insurer(s) or sureties consent to the occupancy or use, and (c) appropriate public authorities authorize the occupancy or use. Such partial occupancy or use shall constitute Substantial Completion of that portion of the Work. The Design-Builder shall not unreasonably withhold consent to partial occupancy or use. The Owner shall not unreasonably refuse to accept partial occupancy or use, provided such partial occupancy or use is of value to the Owner.

#### 9.5 FINAL PAYMENT

9.5.1 Final Payment, consisting of the unpaid balance of the Cost of the Work, compensation for Design Phase services and the Design-Builder's Fee, shall be due and payable when the work is fully completed. Before issuance of final payment, the Owner may request satisfactory evidence that all payrolls, material bills and other indebtedness connected with the Work have been paid or otherwise satisfied. Substantiating documentation that shall accompany the Application for Final Payment shall include, but is



not necessarily limited to, the following: (a) Completed Certificate/Application of Payment signed by all applicable Parties; (b) Contractor's Affidavit for Final Payment, (c) Consent of Surety to Final Payment, (d) Certificate of Completion and Release of Liens, (e) Final/total DBE Utilization data, (f) OSHA recordable accident data, (g) construction waste management documentation, (h) Waiver of Mechanic's Liens, and (i) all maintenance manuals, as-built drawings and warranty certificates that may be required. If any third party fails or refuses to provide a release of claim or waiver of lien as required by Owner, the Contractor shall furnish a bond satisfactory to the Owner to indemnify the Owner from liability

9.5.2 In making final payment the Owner waives all claims except for:

9.5.2.1 outstanding liens and Design-Builders' obligation to satisfy its payment obligations to Subcontractors and Material Suppliers;

9.5.2.2 latent defects or deficiencies not known to Owner at the time of final payment, including but not limited to improper workmanship, defective materials, work not in conformance with the Contract Documents and design defects; and

9.5.2.3 terms of any special warranties required by the Contract Documents.

9.5.3 In accepting final payment, the Design-Builder waives all claims except those previously made in writing and which remain unsettled.

## ARTICLE 10 INDEMNITY

### 10.1 INDEMNITY

10.1.1 To the fullest extent permitted by law, the Design-Builder shall indemnify and hold harmless the Owner, Owner's officers, directors, members, consultants, agents, trustees and employees (the Indemnitees) from all claims for bodily injury, sickness, or death and property damage (other than to the Work itself), including reasonable attorneys' fees, costs and expenses, that may arise from the performance of the Work, but only to the extent caused by the negligent acts or omissions or failure to conform to the provisions of the Contract Documents of the Design-Builder, Subcontractors or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable. The Design-Builder shall not be required to indemnify or hold harmless the Indemnitees for any negligent acts or omissions of the Indemnitees.

10.1.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Design-Builder, its officers, directors or members, Subcontractors or anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable from all claims for bodily injury, sickness or death and property damage (other than to the Work itself), including reasonable attorneys' fees, costs and expenses, that may arise from the performance of work by the Owner or Others, but only to the extent caused by the negligent acts or omissions of the Owner or Others.



10.1.3 NO LIMITATION ON LIABILITY In any and all claims against the Indemnitees by any employee of the Design-Builder, anyone directly or indirectly employed by the Design-Builder or anyone for whose acts the Design-Builder may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Design-Builder under workers' compensation acts, disability benefit acts or other employee benefit acts.

10.2 ROYALTIES, PATENTS AND COPYRIGHTS The Design-Builder shall pay all royalties and license fees which may be due on the inclusion of any patented or copyrighted materials, methods or systems selected by the Design-Builder and incorporated in the Work. The Design-Builder shall defend, indemnify and hold the Owner harmless from all suits or claims for infringement of any patent rights or copyrights arising out of such selection. The Owner agrees to defend, indemnify and hold the Design-Builder harmless from any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods or systems specified by the Owner.

## **ARTICLE 11 SUSPENSION, NOTICE TO CURE, AND TERMINATION**

### **11.1 SUSPENSION BY THE OWNER FOR CONVENIENCE**

11.1.1 The Owner may order the Design-Builder in writing to suspend, delay or interrupt all or any part of the Work without cause for its convenience

11.1.2 Design-Builder is entitled to seek an adjustment of the Contract Price and/or Contract Time(s) if its cost or time to perform the Work has been adversely impacted by any suspension, delay or interruption of work by Owner. Adjustments shall not be sought and shall not be permitted: (1) for short term suspension, delay or interruption required to accommodate or work around campus events or activities; or (2) due to any requirement that Design-Builder coordinate its work with another party or parties performing a separate project for Owner in the vicinity of the Worksite, where such coordination calls for no more than additional planning and communication

### **11.1.3 TERMINATION BY THE OWNER FOR CAUSE**

11.1.3.1 If the Design-Builder persistently fails to supply enough qualified workers, proper materials, or equipment, to maintain the approved Schedule of the Work, or fails to make prompt payment to its workers, Subcontractors or Material Suppliers, disregards Laws or orders of any public authority having jurisdiction, or is otherwise guilty of a material breach of a provision of this Agreement, the Design-Builder may be deemed in default. If the Design-Builder fails within seven (7) Days after receipt of written notice to commence and continue satisfactory correction of such default, then the Owner shall give the Design-Builder and, if applicable, the surety, a second notice to correct the default within a three (3) Day period

11.1.3.2 If the Design-Builder fails to commence and continue satisfactory correction of the default within three (3) Days following receipt of such second notice, the Owner without prejudice to any other rights or remedies may: (a) declare the Design-Builder to be in default



and terminate this Agreement and provide written notice of termination to Design-Builder; (b) take possession of the Worksite; (c) complete the Work utilizing any reasonable means; (d) withhold payment due to the Design-Builder; and (e) as the Owner deems necessary, supply workers and materials, equipment and other facilities for the satisfactory correction of the default, and charge the Design-Builder the costs and expenses, including reasonable Overhead, profit and attorneys' fees.

11.1.3.3 In the event of an emergency affecting the safety of persons or property, the Owner may immediately commence and continue satisfactory correction of a default without first giving written notice to the Design-Builder, but shall give prompt written notice of such action to the Design-Builder following commencement of the action.

11.1.3.4 If the Design-Builder files a petition under the bankruptcy code, this Agreement shall terminate if the Design-Builder or the Design-Builder's trustee fails to assume, or rejects the Agreement, or if there has been a default and the Design-Builder is unable to give adequate assurance that the Design-Builder will perform as required by this Agreement or otherwise is unable to comply with the requirements for assuming this Agreement under the applicable provisions of the United States Bankruptcy Code. The rights and remedies set forth herein shall not be deemed to limit the ability of the Owner to seek any other rights and remedies provided by the Contract Documents or by law, including its ability to seek relief from any automatic stays under the United States Bankruptcy Code.

11.1.3.5 If the Owner exercises its rights under subsection 11.1.3.1 or 11.1.3.2, upon the request of the Design-Builder the Owner shall provide a detailed accounting of the costs incurred by the Owner.

11.1.3.6 If the Owner terminates this Agreement for default, and it is later determined that the Design-Builder was not in default, or that the default was excusable under the terms of the Contract Documents, then, in such event, the termination shall be deemed a termination for convenience, and the rights of the Parties shall be as set forth in section 11.2.

**11.2 TERMINATION BY OWNER FOR CONVENIENCE** If the Owner terminates this Agreement other than as set forth in section 11.1.3, the Owner shall pay the Design-Builder for all Work executed and for all proven loss, cost or expense in connection with the Work, plus all demobilization costs.

11.2.1 If the Owner terminates this Agreement before commencing the Construction Phase, the Design-Builder shall be paid for the Design-Builder's Design Phase services provided to date as set forth in subsection 6.1.

11.2.2 If the Owner terminates this Agreement after commencement of the Construction Phase, the Design-Builder shall be paid for the Construction Phase services provided to date pursuant to subsection 6.2.

11.2.3 The Owner shall also pay to the Design-Builder fair compensation, either by purchase or rental at the election of the Owner, for all equipment retained. The Owner shall



assume and become liable for obligations, commitments and unsettled claims that the Design-Builder has previously undertaken or incurred in good faith in connection with the Work or as a result of the termination of this Agreement. As a condition of receiving the payments provided under this article, the Design-Builder shall cooperate with the Owner by taking all steps necessary to accomplish the legal assignment of the Design-Builder's rights and benefits to the Owner, including the execution and delivery of required papers.

### 11.3 TERMINATION BY THE DESIGN-BUILDER

11.3.1 Upon fourteen (14) Days' written notice to the Owner, the Design-Builder may terminate this Agreement for any of the following reasons:

11.3.1.1 if the Work has been stopped for a sixty (60) Day period

- a. under court order or order of other governmental authorities having jurisdiction; or
- b. as a result of the declaration of a national emergency or other governmental act during which, through no act or fault of the Design-Builder, materials are not available;

11.3.1.2 if the Work is suspended by the Owner for sixty (60) consecutive Days;

11.3.1.3 if the Owner fails to furnish reasonable evidence that sufficient funds are available and committed for the entire cost of the Project in accordance with subsection 3.2 of this Agreement.

11.3.2 If the Owner has for sixty(60) Days failed to pay the Design-Builder pursuant to subsection 9.1.2, the Design-Builder may give written notice of its intent to terminate this Agreement. If the Design-Builder does not receive payment within fourteen (14) Days of giving written notice to the Owner, then upon fourteen (14) Days' additional written notice to the Owner, the Design-Builder may terminate this Agreement.

11.3.3 Upon termination by the Design-Builder in accordance with this section, the Design-Builder shall be entitled to recover from the Owner payment for all Work executed and for all proven loss, cost or expense in connection with the Work, plus all demobilization costs and reasonable damages. In addition, the Design-Builder shall be paid an amount calculated as set forth either in subsection 11.2.1 or 11.2.2, depending on when the termination occurs, and subsection 11.2.3.

## ARTICLE 12 DISPUTE MITIGATION AND RESOLUTION

12.1 WORK CONTINUANCE AND PAYMENT Unless otherwise agreed in writing, the Design-Builder shall continue the Work and maintain the approved schedules during any dispute mitigation or resolution proceedings. If the Design-Builder continues to perform, the Owner shall continue to make payments in accordance with the Agreement.



**12.2 DIRECT DISCUSSIONS** If a dispute arises between the parties relative to the Work, the Project, or otherwise related to this Agreement, the Parties shall follow the procedures set forth in this ARTICLE. The Parties shall first endeavor to reach resolution through good faith direct discussions between the Parties' representatives, who shall possess the necessary authority to resolve such matter and who will record the date of first discussions. If the Parties' representatives are not able to resolve such matter within ten (10) Business Days from the date of first discussion, the Parties' representatives shall immediately inform senior executives of the Parties in writing that resolution was not affected. Upon receipt of such notice, the senior executives of the Parties shall meet within ten (10) Business Days to endeavor to reach resolution. If the dispute remains unresolved after thirty (30) Days from the date of first discussion, the Parties shall submit such matter to the dispute resolution procedures selected herein.

**12.3 MEDIATION** If direct discussions pursuant to section 12.2 do not result in resolution of the matter, the Parties shall endeavor to resolve the matter by mediation. The mediator shall be jointly selected by the Parties, and the mediator shall apply rules and procedures of his or her own choosing. In the event that the Parties are unable to mutually agree upon selection of a mediator, the mediator selection procedures within the current Construction Industry Mediation Rules of the American Arbitration Association (AAA) shall be utilized. The administration of the mediation shall be as mutually agreed by the Parties. The mediation shall be convened within sixty (60) Business Days of the conclusions of direct discussions pursuant to section 12.2. Either Party may terminate the mediation at any time after the first session by written notice to the non-terminating Party and mediator. The mediator's fees and expenses, shall be shared equally by the Parties. The venue of any mediation procedure shall be State College, Pennsylvania, unless the parties mutually agree upon a different location.

**12.4 BINDING DISPUTE RESOLUTION** If the matter is unresolved after the conclusion of mediation, the Parties shall submit the matter to binding arbitration. A single arbitrator shall be jointly selected by the Parties. In the event that the parties are unable to mutually agree upon selection of an arbitrator, the arbitrator selection procedures within the current Construction Industry Arbitration Rules of the AAA shall be utilized. The binding arbitration process shall proceed according to rules and procedures mutually agreed upon by the Parties, in consultation with the arbitrator. In the event that the Parties are unable to mutually agree upon the rules and procedures to be applied, the aforementioned AAA Arbitration Rules shall be utilized. The arbitrator's fees and expenses shall be shared equally by the Parties. The Parties shall be responsible for their own attorneys' fees and other costs associated with arbitration. The venue of any binding dispute resolution procedure shall be State College, Pennsylvania unless the Parties mutually agree upon a different location.

**12.4.1** Neither Party may commence arbitration if the claim or cause of action would be barred by the applicable statute of limitations under Pennsylvania law. Receipt of a demand for arbitration by the person or entity administering the arbitration shall constitute the commencement of legal proceedings for the purposes of determining whether a claim or cause of action is barred by the applicable statute of limitations.



12.4.2 An award entered in an arbitration proceeding pursuant to this Agreement shall be final and binding upon the Parties, and judgment may be entered upon an award in any court having jurisdiction.

12.5 The Parties agree that the exclusive means of resolving any and all disputes relating to or arising out of this Agreement shall be pursuant to the procedures specified within this ARTICLE of the Agreement. However, in the event that either Party attempts to file any legal or equitable cause of action in a court of law for purposes of interpretation or enforcement of this Agreement, whether or not such a court filing is permissible under this Agreement, the sole and exclusive venue for such filing shall be the Court of Common Pleas of Centre County, Pennsylvania.

12.6 MULTIPARTY PROCEEDING All Parties necessary to resolve a matter agree to be parties to the same dispute resolution proceeding. Appropriate provisions shall be included in all other contracts relating to the Work to provide for the joinder or consolidation of such dispute resolution proceedings.

## **ARTICLE 13 MISCELLANEOUS**

13.1 EXTENT OF AGREEMENT: Except as expressly provided, this Agreement is for the exclusive benefit of the Parties, and not for the benefit of any third party. This Agreement represents the entire and integrated agreement between the Parties, and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement and each and every provision is for the exclusive benefit of the Owner and Design-Builder and not for the benefit of any third- party.

13.2 ASSIGNMENT: Except as to the assignment of proceeds, neither Party shall assign its interest in this Agreement without the written consent of the other Party. The terms and conditions of this Agreement shall be binding upon both Parties, their partners, successors, assigns and legal representatives. Neither Party shall assign the Agreement as a whole without written consent of the other.

13.3 GOVERNING LAW: This Agreement shall be governed and interpreted in accordance with the laws of the Commonwealth of Pennsylvania.

13.4 SEVERABILITY: The partial or complete invalidity of any one or more provisions of this Agreement shall not affect the validity or continuing force and effect of any other provision.

13.5 NO WAIVER OF PERFORMANCE: The failure of either Party to insist, in any one or more instances, on the performance of any of the terms, covenants, or conditions of this Agreement, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance.

13.6 TITLES: The titles given to the articles and sections are for ease of reference only and shall not be relied upon or cited for any other purpose.

13.7 JOINT DRAFTING: The Parties expressly agree that this Agreement was jointly drafted, and that both had opportunity to negotiate its terms and to obtain the assistance of counsel in



reviewing its terms prior to execution. Therefore, this Agreement shall be construed neither against nor in favor of either Party, but shall be construed in a neutral manner.

**13.8 RIGHTS AND REMEDIES:** The Parties' rights, liabilities, responsibilities and remedies with respect to this Agreement, whether in contract, tort, negligence or otherwise, shall be exclusively those expressly set forth in this Agreement.

**13.9 PREVAILING WAGE ACT:** The Design-Builder is hereby notified that this Contract is subject to the provisions, duties, obligations, remedies and penalties of the Pennsylvania Prevailing Wage Act, Act No. 442, August 15, 1961 (P.L. 987), and as amended August 9, 1963, Act No. 342; and said Act is incorporated herein by reference as fully as though the same were here set forth at length.

**13.10 EQUAL EMPLOYMENT OPPORTUNITY AND REFERRAL TO NON-DISCRIMINATION CLAUSE:** Design-Builder shall not discriminate against any employee, applicant for employment, any independent Contractor or any other person because of race, color, religious creed, ancestry, national origin, service in the uniformed services (as defined in state and federal law), veteran status, age, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas, or any other basis prohibited by law.

In performing the work or making or furnishing any article required by this Contract, the Design-Builder shall comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and all subsequent rules, regulations, and relevant orders of the Secretary of Labor. The Design-Builder will comply with all provisions of Executive Order 1972-1 or any regulations issued by the Pennsylvania Human Relations Commission, 16 Pa. Code, Chapter 49. The Non-Discrimination Clause as issued by the Pennsylvania Human Relations Commission is included below.

**13.11 NON-DISCRIMINATION CLAUSE:** During the term of this Contract, Design-Builder agrees as follows:

13.11.1 Design-Builder shall not discriminate against any employee, applicant for employment, any independent Contractor or any other person because of race, color, religious creed, ancestry, national origin, service in the uniformed services (as defined in state and federal law), veteran status, age, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas, or any other basis prohibited by law.

13.11.2 Design-Builder shall take affirmative action to ensure that applicants are employed, and that employees or agents are treated during employment, without regard to their race, color, religious creed, ancestry, national origin, service in the uniformed services (as defined in state and federal law), veteran status, age, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas, or any other basis prohibited by law. Such affirmative action shall include, but is not limited to, the following: Employment



upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training.

Design-Builder shall post in conspicuous places, available to employees, agents, applicants for employment and other persons, notices to be provided by the contracting agency setting forth the provisions of this non-discrimination clause.

13.11.3 Design-Builder shall take affirmative action to ensure that applicants are employed, and that employees or agents are treated during employment, without regard to their race, color, religious creed, ancestry, national origin, age, or sex. Such affirmative action shall include, but is not limited to, the following: Employment upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training.

13.11.4 Design-Builder shall post in conspicuous places, available to employees, agents, applicants for employment and other persons, notices to be provided by the contracting agency setting forth the provisions of this non-discrimination clause.

13.11.5 Design-Builder shall in solicitations or advertisements placed by it or on its behalf state all qualified applicants will receive consideration for employment without regard to race, color, religious creed, ancestry, national origin, age, or sex.

13.11.6 Design-Builder shall send each labor union or workers' representative with which it has a collective bargaining agreement or other contract or understanding, a notice advising said labor union or workers' representative of its commitment to this non-discrimination clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment. Similar notices shall be sent to every other source of recruitment utilized by Design-Builder.

13.11.7 It shall be no defense to a finding of a non-compliance with this non-discrimination clause that recipient had delegated some of its employment practices to any union, training program or other source of recruitment which prevents it from meeting its obligations. However, if the evidence indicates that the Design-Builder was not on notice of the third-party discrimination, or made a good faith effort to correct it, such factor shall be considered in mitigation in determining appropriate sanctions.

13.11.8 Where the practices of a union or any training program or other source of recruitment will result in the exclusion of minority group persons, so that Design-Builder will be unable to meet its obligations under this non-discrimination clause, the Design-Builder shall then employ and fill vacancies through other non-discriminatory employment procedures.

13.11.9 Design-Builder shall comply with all rules, regulations and orders issued by the Governor, the Attorney General, and the Human Relations Commission relating to laws, prohibiting discrimination in hiring or employment opportunities. In the event of Design-Builder's non-compliance with the non-discrimination clause of this Contract or with any such rules, regulations or orders, this Contract may be cancelled, terminated or suspended in whole or in part, and recipient may be declared ineligible for further Commonwealth contracts, and such



other sanctions may be imposed and remedies invoked as provided by rule, regulation or order of the Governor, Attorney General, or the Human Relations Commission, or as otherwise provided by law.

13.11.10 Design-Builder shall furnish all necessary employment documents and records to, and permit access to its books, records and accounts by the Owner and the Office of Administration, Bureau of Affirmative Action, for purposes of investigation to ascertain compliance with this clause. If Design-Builder does not possess documents or records reflecting the necessary information requested, it shall furnish such information on reporting forms supplied by the Owner or by the Bureau of Affirmative Action.

13.12 STEEL PRODUCTS PROCUREMENT ACT: This project is subject to the provisions of the Steel Products Procurement Act of 1978 (P.L. 6, No. 3) as amended by the Act of July 9, 1984 (P.L. 674, No. 144). The Design-Builder, Subcontractors, and Material Suppliers shall be required to comply with all provisions of this Act.

13.13 COLLABORATIVE ENVIRONMENT: Design-Builder, with assistance from the Owner, shall develop an Integrated Project Delivery plan outlining collaborative concepts to be incorporated into the Work. Collaboration Plan shall incorporate integrated concepts such as early involvement of key participants, decision making process mapping, co-location, team-building, and information sharing technology options. Performance measures shall also be established for the project by the Parties to drive team performance and tracked quarterly.

13.14 PENNSYLVANIA STATE UNIVERSITY PROJECT DELIVERY SYSTEM: Design-Builder shall assist the Owner in the development of the project deliverable requirements as outlined in the "Pennsylvania State University Project Delivery System." Refer to Exhibit E for the process diagram and deliverable listing. The Pennsylvania State University Project Delivery Guidebook, which defines the process and the deliverables, will be made available to the Design-Builder by the Owner.

13.15 DISADVANTAGED BUSINESS ENTERPRISE PROGRAM (DBE): Develop and implement a system to attain DBE participation. The Owner has set a goal of 15% combined utilization of DBE contractors and suppliers. Design-Builder will track and monitor the DBE participation and submit monthly updates to the Owner. In coordination with the Owner, the Design-Builder is to conduct an Open House and hold workshops in an effort to increase DBE participation. All efforts shall be coordinated with the Office of Physical Plant Contractor Liaison. It is also expected that the Design-Builder actively pursue DBE participation for consulting and professional services. Percentage participation shall be reported to the Owner upon request.

13.16 BACKGROUND CHECK POLICY: The Design -Builder and each Trade Contractor confirms that all employees (including the employees of any subconsultants/subcontractors) assigned to this project and who conduct their work on Penn State premises have had background checks that meet or exceed the University's standards for the type of work being performed per the background check process for third-party employees outlined in PSU Policy HR99 Background Check Process (<http://guru.psu.edu/policies/OHR/hr99.html>).



13.17 PUBLIC WORKS EMPLOYMENT VERIFICATION ACT

13.17.1 As a precondition to the award of the contract for the Work described herein, Design - Builder and each Trade Contractor must complete the Commonwealth of Pennsylvania ‘Public Works Employment Verification Form’ (“Form”) and provide a copy to Owner.

13.17.2 Furthermore, by execution of this Agreement, the Design -Builder and each Trade Contractor hereby affirms as follows:

13.17.2.1 Design -Builder and each Trade Contractor is presently and shall remain in compliance with the Pennsylvania Public Works Employment Verification Act (“the Act”) through utilization of the Federal E-Verify Program (“EVP”) operated by the United States Department of Homeland Security.

13.17.2.2 Design-Builder and each Trade Contractor will ensure that all contracts with subcontractors contain notification of the applicability of the Act, information regarding the use of EVP, and either a copy of the Form or a reference to the Pennsylvania Department of General Services website at [www.dgs.state.pa.us](http://www.dgs.state.pa.us) , where the Form may be obtained. Design -Builder and each Trade Contractor will further ensure that prior to beginning onsite or offsite work, every subcontractor shall submit a completed Form to the Owner.

13.17.2.3 Design-Builder and each Trade Contractor shall utilize EVP to verify the employment eligibility of each new employee hired, whether the new employee will be performing onsite or offsite work, within five (5) business days of the employee’s start date and shall maintain documentation of continued compliance with the Act for the duration of this Agreement.

13.17.2.4 Design-Builder and each Trade Contractor shall cooperate with Owner and Pennsylvania Department of General Services in the event of an audit arising under the Act.

13.18 TAXES The Design-Builder and each Trade Contractor shall pay sales, consumer, use and similar taxes for the Work on portions thereof provided by the Contractor which are legally enacted when bids are received, whether or not yet effective or merely scheduled to go into effect. The Design-Builder and each Trade Contractor is obligated to pay all Pennsylvania sales tax with the exception of those items for which an exemption might be claimed under Sales and Use Tax Regulation (S31.11--SS31.16).

The Design-Builder and each Trade Contractor shall agree to assign and transfer to the Owner all its rights to sales and use tax which may be refunded as a result of a claim for refund for material purchased in connection with this contract. The Design-Builder and each Trade Contractor further agrees that is will not file a claim for refund for any sales or use tax which is the subject of this assignment. The Design-Builder and each Trade Contractor shall incorporate this Owner’s right to any and all Subcontracts.

13.19 RIGHT TO AUDIT:



13.19.1 Design-Builder's "records" shall upon reasonable notice be open to inspection and subject to audit and/or reproduction during normal business working hours. An Owner's representative or an outside representative engaged by Owner may perform such audits. The Owner or its designee may conduct such audits or inspections throughout the term of this contract and for a period of three years after final payment or longer if required by law.

13.19.2 Design-Builder's "records" as referred to in this contract shall include any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, recordings, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in Owner's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Document. Such records shall include (hard copy, as well as computer readable data if it can be made available), written policies and procedures; time sheets; payroll registers; cancelled checks; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); backcharge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other contractor records which may have a bearing on matters of interest to the Owner in connection with Design-Builder's dealings with the Owner (all foregoing hereinafter referred to as "records") to the extent necessary to adequately permit evaluation and verification of: a) contractor compliance with contract requirements, b) compliance with Owner's business ethics policies, and c) compliance with provisions for pricing change orders, invoices or claims submitted by the contractor or his payees.

13.19.3 Design-Builder shall require all payees (examples of payees include subcontractors, insurance agents, material suppliers, etc.) to comply with the provisions of this article by incurring the requirements hereof in a written contract agreement between Design-Builder and payee. Such requirements to include flow-down right of audit provisions in contracts with payees will also apply to Subcontractors and Sub-Subcontractors, material suppliers, etc. Design-Builder will cooperate fully and will require Related Parties and all of Design-Builder's subcontractors (including those entering into lump sum subcontracts) to cooperate fully in furnishing or in making available to Owner from time to time whenever requested in an expeditious manner any and all such information, materials and data.

13.19.4 Owner's authorized representative or designee shall have reasonable access to the Design-Builder's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of this contract and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this article.

13.19.5 If an audit inspection or examination in accordance with this Article, discloses overpricing or overcharges (of any nature) by the Design-Builder or any subcontractor to the Owner in excess of one-half of one percent (.5%) of the total contract billings, the reasonable actual cost of the Owner's audit shall be reimbursed to the Owner by the Design-Builder. Any adjustments and/or payments which must be made as a result of any such audit or inspection



of the Design-Builder's invoices and/or records shall be made within a reasonable amount of time (not to exceed 90 days) from presentation of Owner's findings to Design-Builder.

#### 13.20 CONSTRUCTION WASTE MANAGEMENT:

13.20.1 The Design-Builder is required to recycle and/or salvage 75% construction, demolition, and land-clearing waste. A waste management plan is to be developed for the project which outlines how you will achieve the required recycling rate, including materials to be recycled or salvaged, materials handling requirements, and how you will communicate the plan to your crews and trade/subcontractors. The waste management plan is to be approved by the Office of Physical Plant Project Leader and submitted with the initial application for payment.

13.20.2 At the end of the project, prior to the application for Final Payment, the Design-Builder is required to submit a calculation documenting that the project achieved a 75% diversion rate. The Application for Final Payment will be held until this documentation is received by the Owner. The documentation should include a tabulation of the total waste material, quantities diverted and the means by which they were diverted. A signature declaring that the requirements have been met must be included.

13.20.3 If this project is attempting to achieve LEED certification, the LEED process to achieve the Construction Waste Management credit(s) supersedes this section.

13.21 LEAD-FREE PLUMBING CERTIFICATION: The Design-Builder shall provide a certification that all plumbing materials are lead-free and meet the requirements of the Pennsylvania Plumbing and Lead Ban Notification Act. This certification shall be signed by the Design-Builder, notarized and submitted to the University before the water service turn-on.

13.22 FEDERAL CLEAN AIR ACT: The Design-Builder agrees to fully protect, indemnify, hold harmless and defend the Owner against any and all liability, including assessed violation fines, for failure to comply with the Federal Clean Air Act [42 U.S.C. §7401 et seq., amended 1990], with regards to handling, venting, and/or disposing of any and all refrigerants used in the performance of the Work. A copy of employee(s) or subcontractor(s) Federal Certification numbers shall be provided to the Owner upon request.

13.23 EXECUTION OF AGREEMENT: This Agreement may be executed in counterparts, each of which shall for all purposes be deemed an original and all such counterparts, taken together, shall constitute one and the same Agreement. The Parties further agree that executed copies of this Agreement may be exchanged electronically or by facsimile and that a signature transmitted in such a manner shall be acceptable and binding and shall be treated for all purposes in the same manner as an original signature.

#### 13.24 SOCIAL RESPONSIBILITY / CONTRACTOR CONDUCT

13.24.1 Fulfilling the mission of The Pennsylvania State University for those we serve requires the highest standards of integrity, responsibility, and respect, and we encourage our contractors/suppliers to aspire to those same standards, particularly when on campus or engaging with members of the University community. The University has adopted the [Global](#)



[Sullivan Principles of Social Responsibility](#). We also encourage our contractors/suppliers to adopt and follow these principles.

13.24.2 The University is committed to equal access to programs, facilities, admission and employment for all persons, in an environment free of harassment and free of discrimination. Conduct constituting harassment or discrimination in the University environment, as prohibited in University Policy AD85, is subject to corrective action.

13.25 GAS LINE: The University Park campus is traversed by a 12” high pressure gas transmission line. The Design- Builder must follow precautions and requirements as outlined on the plan set. The routing of the gas line is available at the following link:

[http://www.opp.psu.edu/planning-construction/design\\_and\\_construction\\_standards/documents/job-kit-construction-services/columbia-gas-line-routing-map/view](http://www.opp.psu.edu/planning-construction/design_and_construction_standards/documents/job-kit-construction-services/columbia-gas-line-routing-map/view)

13.25.1 The Design Builder must review the project location relative to the gas routing and coordinate all requirements with Columbia Gas.

## ARTICLE 14 CONTRACT DOCUMENTS

14.1 CONTRACT DOCUMENTS The Contract Documents are as follows:

- (a) This Agreement, including all Exhibits, as identified at section 1.3.2.
- (b) Basis of Design/Owner’s Program.
- (c) Owner provided information pursuant to Article 3 and other Owner information identified as intended to be a contract document.
- (d) The Schematic Design Documents upon Owner approval pursuant to section 2.1.4.
- (e) The Design Development Documents upon Owner approval pursuant to section 2.1.6.
- (f) The Construction Documents upon Owner approval under section 2.1.7.
- (g) Any/all procurement instruments issued by the Owner in the procurement of this Agreement, together with all respective responses or submissions of the Design-Builder.

14.2 ORDER OF PRECEDENCE In case of any inconsistency, conflict or ambiguity among the Contract Documents, the documents shall govern in the following order: (a) Change Orders and written amendments to this Agreement, including Amendment 1; (b) this Agreement; (c) design documents approved by the Owner pursuant to sections 2.1.4 - 2.1.7 in order of the most recently approved; (d) information furnished by the Owner pursuant to Article 3 or designated as a contract document in ARTICLE 14; (e) other documents listed in this Agreement. Except as otherwise provided, among categories of documents having the same order of precedence, the term or provision that includes the latest date shall control. Information identified in one Contract Document and not identified in another shall not be considered a conflict or inconsistency.

## ARTICLE 15 INSURANCE

15.1 DESIGN-BUILDER’S INSURANCE



15.1.1 Before commencing the Work and as a condition precedent to payment, the Design-Builder shall procure and maintain the following insurance, in amounts not less than that specified for each type:

15.1.1.1 **Workers' Compensation** for statutory obligations imposed by workers' compensation and occupational disease laws. **Employers' Liability** insurance shall be provided with limits not less than:

- a) \$500,000 bodily injury by accident per accident
- b) \$500,000 bodily injury by disease policy limit
- c) \$500,000 bodily injury by disease per employee

15.1.1.2 **Business Automobile Liability** (bodily injury liability and property damage liability) for all owned, leased, hired, non-owned vehicles with limits not less than \$1,000,000 Combined Single Limit.

15.1.1.3 **Commercial General Liability** insurance including coverage for bodily injury, property damage, and personal and advertising injury, for premises and operations, products and completed operations, and contractual liability arising from all operations, written on an occurrence basis with limits not less than:

FOR PROJECTS UNDER \$1,000,000

- a) Per occurrence: \$1,000,000
- b) General aggregate: \$2,000,000
- c) Products/completed operations aggregate: \$2,000,000
- d) Personal and advertising injury limit: \$1,000,000
- e) Medical Expense Limit: \$10,000

The Design-Builder shall maintain completed operations liability insurance for not less than one year after Substantial Completion, or as required by the Contract Documents, whichever is longer.

FOR PROJECTS OVER \$1,000,000

- a) Per occurrence: \$5,000,000
- b) General aggregate: \$5,000,000
- c) Products/completed operations aggregate: \$5,000,000
- d) Personal and advertising injury limit: \$5,000,000
- e) Medical Expense Limit: \$10,000

The Design-Builder shall maintain completed operations liability insurance for not less than two years after Substantial Completion, or as required by the Contract Documents, whichever is longer.

15.1.1.4 **Professional Liability** insurance: Where professional services are being provided by licensed and non-licensed professionals, the Design-Builder shall obtain, either itself or



through the Design Professional, professional liability insurance for claims arising from the negligent performance of professional services under this Agreement (including, but not limited to, acts, errors, or omissions of the company and its employees), which shall be written for not less than One Million dollars (\$1,000,000) or the total of the Design Fee portion of the Contract, whichever is greater, per claim and in the aggregate. The Professional Liability insurance shall include prior acts coverage sufficient to cover all services rendered by the Design-Professional. This coverage shall be continued in effect for 3 year(s) after the Date of Substantial Completion.

**15.1.1.5 Pollution Liability** insurance: If the nature of the Work involves professional services, evaluating, testing, remediation, abatement, removal, storage, and transportation of hazardous materials or substances or pollutants, the Design-Builder and those Subcontractors involved in such work shall obtain Pollution Liability insurance applicable to their work, for bodily injury and property damage with limits not less than:

FOR PROJECTS UNDER \$1,000,000

- a) Per occurrence or claim: \$1,000,000
- b) Aggregate: \$1,000,000

FOR PROJECTS OVER \$1,000,000

- a) Per occurrence or claim: \$5,000,000
- b) Aggregate: \$5,000,000

The Pollution Liability insurance must include coverage for completed operations extending three (3) years after final acceptance of the project by the owner or such longer period as the contract documents may require. The definition of property damage shall include clean-up costs. If the insurance is written on a claims-made basis, the policy retroactive date shall be prior to the start of the Design-Builders/trade-contractor's/supplier's/vendor's work, and the renewal policies shall maintain the same retroactive date.

15.1.2 The insurance limits required for the Employers' Liability, Business Automobile Liability and CGL coverage required under subsection 15.1.1 may be provided by a combination of primary and Excess or Umbrella Liability policies.

15.1.3 The Owner must be named on the Design-Builder's Commercial General Liability insurance as an additional insured.

15.1.4 The Design-Builder shall maintain in effect all insurance coverage required under subsection 15.2.1 with insurance companies lawfully authorized to do business in the jurisdiction in which the Project is located.

15.1.5 If the Design-Builder fails to obtain or maintain any insurance coverage required under this Agreement, the Owner may purchase such coverage and charge the expense to the Design-Builder, or terminate this Agreement.



15.1.6 Insurance policies required under subsection 15.1 shall contain a provision that the insurance company or its designee must give the Owner written notice transmitted in paper or electronic format: (a) 30 days before coverage is non-renewed by the insurance company and (b) within 10 business days after cancelation of coverage by the insurance company.

15.1.7 Prior to commencing the Work and upon renewal or replacement of the insurance policies, the Design-Builder shall furnish the Owner with certificates of insurance until one year after Substantial Completion or longer if required by the Contract Documents. In addition, if any insurance policy required under subsection 15.1 is not to be immediately replaced without lapse in coverage when it expires, exhausts its limits, or is to be cancelled, the Design-Builder shall give Owner prompt written notice upon actual or constructive knowledge of such condition.

15.1.8 The Design-Builder's insurance shall be primary and non-contributory to the University's insurance.

15.1.9 Failure of the Design-Builder to procure, carry, and maintain the required insurance shall not relieve the Design-Builder, and any Subcontractor thereof, of any obligation or liability assumed under this Agreement, nor of any obligation or liability imposed by law.

15.1.10 Any self-insured retentions, deductibles, and exclusions in coverage in the insurance required shall be assumed by and at the sole risk of the Design-Builder.

## 15.2 PROPERTY INSURANCE

15.2.1 Before commencing the Work, the Owner shall obtain and maintain a Builder's Risk Policy upon the entire Project for the full cost of replacement at the time of loss. This insurance shall also name the Design-Builder, Subcontractors, Subsubcontractors, Material Suppliers and Design-Professional as named insureds. This insurance shall be written as a Builder's Risk Policy or equivalent form to cover risks of physical loss except those specifically excluded by the policy, and shall insure (a) at least against the perils of fire, lightning, explosion, windstorm, hail, smoke, aircraft (except aircraft, including helicopter, operated by or on behalf of Design-Builder) and vehicles, riot and civil commotion, theft, vandalism, malicious mischief, debris removal, flood, earthquake, earth movement, water damage, wind damage, testing if applicable, collapse however caused, and (b) damage resulting from defective design, workmanship or material and material or equipment stored offsite, onsite or in transit. This policy shall provide for a waiver of subrogation in favor of the Design-Builder, Subcontractors, Subsubcontractors, Material Suppliers and Design-Professional. This insurance shall remain in effect until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property to be covered by this insurance, whichever is sooner. Partial occupancy or use of the Work shall not commence until the Owner has secured the consent of the insurance company or companies providing the coverage required in this subsection. Before commencing the Work, the Owner shall provide a copy of the property policy or policies obtained in compliance with this subsection.



15.2.1.1 The Builder's Risk property insurance has a deductible. The Design-Builder shall be responsible for the first \$25,000 of such deductible. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. Design-Builder's payment towards the deductible will not exceed \$25,000 per occurrence.

15.2.2 If the Owner does not intend to purchase the property insurance required by this Agreement, including all of the coverages and deductibles described herein, the Owner shall give written notice to the Design-Builder and the Design-Professional before the Work is commenced. The Design-Builder may then provide insurance to protect its interests and the interests of the Subcontractors and Subsubcontractors, including the coverage of deductibles. The cost of this insurance shall be charged to the Owner in a Change Order. The Owner shall be responsible for all of Design-Builder's costs reasonably attributed to the Owner's failure or neglect in purchasing or maintaining the coverage described above.

15.2.2.1 If the Owner does not obtain insurance to cover the risk of physical loss resulting from Terrorism, the Owner shall give written notice to the Design-Builder before the Work commences. The Design-Builder may then provide insurance to protect its interests and the interests of the Subcontractors and Subsubcontractors against such risk of loss, including the coverage of deductibles. The cost of this insurance shall be charged to the Owner in a Change Order.

15.2.3 Owner and Design-Builder waive all rights against each other and their respective employees, agents, contractors, subcontractors and subsubcontractors, and design professionals for damages caused by risks covered by the property insurance except such rights as they may have to the proceeds of the insurance and such rights as the Design-Builder may have for the failure of the Owner to obtain and maintain property insurance in compliance with subsection 15.2.1.

15.2.4 RISK OF LOSS Except to the extent a loss is covered by applicable insurance, risk of loss or damage to the Work shall be upon the Design-Builder until the Date of Substantial Completion, unless otherwise agreed to by the Parties.

### 15.3 OWNER'S INSURANCE

15.3.1 BUSINESS INCOME INSURANCE The Owner may procure and maintain insurance against loss of use of the Owner's property caused by fire or other casualty loss.

OWNER'S LIABILITY INSURANCE The Owner shall maintain its own liability insurance for protection against claims arising out of the performance of this Agreement, including loss of use and claims, losses and expenses arising out of the Owner's acts or omissions.

## ARTICLE 16 BONDS



16.1 Performance and Payment Bonds are required of the Design-Builder. Such bonds shall be issued by a surety admitted in the state in which the Project is located and must be acceptable to the Owner. Owner's acceptance shall not be withheld without reasonable cause.

16.2 Such Performance Bond shall be issued in the penal sum equal to one-hundred percent (100%) of the Guaranteed Maximum Price (GMP).

Such Performance Bond shall cover the cost to complete the Work, but shall not cover any damages of the type specified to be covered by the insurance pursuant to Article 16, whether or not such insurance is provided or is in an amount sufficient to cover such damages.

16.3 The penal sum of the Payment Bond shall equal the penal sum of the Performance Bond. The Design-Builder's Payment Bond for the Project, if any, shall be made available by the Owner or the Design-Builder upon the Subcontractor's written request.

16.4 Any increase in the GMP Price that exceeds ten percent [10%] in the aggregate shall require a rider to the Bonds increasing penal sums accordingly. Up to such ten percent [10%] amount, the penal sum of the bond shall remain equal to one-hundred percent [100%] of the GMP or as otherwise provided in subsection 16.2. The Design-Builder shall endeavor to keep its surety advised of changes within the scope of the initial Agreement potentially impacting the GMP or the Dates of Substantial Completion or Final Completion, though the Design-Builder shall require that its surety waives any requirement to be notified of any alteration or extension of time. A copy of the Design-Builder's Payment Bond for the Project, if any, shall be furnished by the Owner or the Design-Builder upon the Subcontractor's written request.

THIS AGREEMENT entered into as of the day and year written above.

**THE PENNSYLVANIA STATE UNIVERSITY, OWNER**

\_\_\_\_\_ Title

\_\_\_\_\_ ATTEST  
Secretary

Date of Execution: \_\_\_\_\_

**XXXXXXXXXXXXXXXXXXXXXXXXXXXX, DESIGN-BUILDER**

\_\_\_\_\_ Name: \_\_\_\_\_

\_\_\_\_\_ ATTEST  
Secretary or Treasurer



(print name of person signing above)

(circle appropriate title)

Title: \_\_\_\_\_  
(print title of person signing above)

Federal ID Number: \_\_\_\_\_

END OF DOCUMENT.

