

The Standard at Morgantown Third Ward City of Morgantown Monongalia County, West Virginia Tax Map 26-A, Parcels 6, 7, 8, 9, 10, 11, 12, 13, 14, & 15 Planning Commission Submission 10/02/2015



OWNERS

LANDMARK
COLLEGIATE DEVELOPMENT

455 Epps Bridge Parkway, Suite 201
Athens, GA 30606
Phone: 706/310-0400
Fax: 706/310/0411

ENGINEERS

CTL ENGINEERING OF WEST VIRGINIA, INC.
1091 Chaplin Hill Road Morgantown, WV 26501
1011-A-F Street South Charleston, WV 25303
Phone: 304/292-1135 Phone: 304/746-1140
Fax: 304/296-9302 Fax: 304/746-1142
CONSULTING ENGINEERS • TESTING • INSPECTION SERVICES • ANALYTICAL LABORATORIES

Williams & Associates
Engineering • Surveying
Landscape Architecture

BKV GROUP

ARCHITECTS

Index:

Civil

- 1.01 - Title Page
- 1.02 - Property Survey
- 2.01 - Existing Conditions
- 2.02 - Existing Conditions - 300'
- 3.01 - Site Plan
- 3.02 - Grading Plan
- 3.03 - Utility Plan
- 3.04 - Storm Water Plan
- 3.05 - Erosion and Sediment Control Plan
- 3.06 - Site Plan - 300'
- 3.07 - Turning Maneuvers - Garbage Truck
- 3.08 - Turning Maneuvers - WV-40 Truck
- 3.09 - Turning Maneuvers - Garage Entrance

- Electrical
- 4.01 - Electrical Photometric Site Plan
- 4.02 - Electrical Parking Level Photometric Plan
- Landscape
- 4.03 - Landscape Title Sheet
- 4.04 - Preliminary Site & Landscape Plan
- 4.05 - Construction Details

Architecture

- 6.01 - Level -2 Overall Plan
- 6.02 - Level -1 Overall Plan
- 6.03 - Level 0 Overall Plan
- 6.04 - Level 1 Overall Plan
- 6.05 - Level 2 Overall Plan
- 6.06 - Level 3 Overall Plan
- 6.07 - Level 4 Overall Plan
- 6.08 - Level 5 Overall Plan
- 6.09 - Level 6 Overall Plan
- 6.10 - Level 7 Overall Plan
- 6.11 - Level 8 Overall Plan
- 6.12 - Level 9 Overall Plan
- 6.13 - Level 10 Overall Plan
- 6.14 - Roof Plan
- 6.15 - Floor Area Calculation Plans
- 6.16 - Floor Area Calculation Plans
- 6.17 - Sun Studies Existing
- 6.18 - Sun Studies Proposed
- 6.19 - Wind Studies
- 7.01 - Building Elevation Perspectives
- 7.02 - Exterior Elevations
- 7.03 - Exterior Elevations
- 7.04 - Transparency Studies

Construction Schedule:
Demolition of Existing Improvements: 5/2016-8/2016
Rough Grading: 8/2019-1/2017
Foundation construction: 1/2017-6/2017
Parking deck construction: 4/2016-8/2017
Building construction: 6/2017-7/2018
Note: The project is not intended to be constructed in phases

Current Property Owners			
26A	6	Woodford Oil Company	P.O. Box 567, Elkins, WV 26241
26A	7	Woodford Oil Company	P.O. Box 567, Elkins, WV 26241
26A	8	Sharper Industries Inc.	75 Wall Street, Morgantown, WV 26505
26A	9	Woodford Oil Company	P.O. Box 567, Elkins, WV 26241
26A	10	Sharper Industries Inc.	75 Wall Street, Morgantown WV 26505
26A	11	Sharper Industries Inc.	75 Wall Street, Morgantown WV 26505
26A	12	Sharper Industries Inc.	75 Wall Street, Morgantown WV 26505
26A	13	Vic's Garage Inc.	1303 University Avenue, Morgantown, WV 26505
26A	14	Vic's Garage Inc.	1303 University Avenue, Morgantown, WV 26505
26A	15	Vic's Garage Inc.	1303 University Avenue, Morgantown, WV 26505

Residential Unit Types					
Unit Type	Number of Bedrooms	Number of Units	Unit Type	Number of Bedrooms	Number of Units
S-1	Efficiency	11	C-4 P	3 Bedroom	1
S-2	1 Bedroom	11	D-1	4 Bedroom	35
S-3	1 Bedroom	1	D-2	4 Bedroom	8
A-1	1 Bedroom	11	D-3	4 Bedroom	17
A-2	1 Bedroom	20	D-4	4 Bedroom	20
A-3	1 Bedroom	1	E-1	5 Bedroom	11
B-1	2 Bedroom	33	E-2	5 Bedroom	11
B-2	2 Bedroom	5	E-3	5 Bedroom	7
B-3	2 Bedroom	2	E-4	5 Bedroom	2
B-4	2 Bedroom	2	E-5	5 Bedroom	11
B-5	2 Bedroom	21	E-6 P	5 Bedroom	4
C-1	3 Bedroom	1	E-7 P	5 Bedroom	2
C-2	3 Bedroom	12	E-8 P	5 Bedroom	1
C-3	3 Bedroom	4	F-1	6 Bedroom	11
Total Number of Units					276

Total Property Acreage = 1.95 Acres

No Covenants or Restrictions were Found

Building Square Footage	
COMMERCIAL	13,351 ft ²
RETAIL	8,486 ft ²
HOUSING STOR.	6,290 ft ²
BLDG. SERVICES	2,028 ft ²
BLDG. COMMON	77,537 ft ²
PARKING	225,554 ft ²
HOUSING GSF	334,092 ft ²
TOTAL FLOOR GSF	667,338 ft ²

NOTES:

- Above ground utility lines and appurtenances are shown as located in the field. Underground utilities and appurtenances are approximate only, their locations derived from surface location and/or information provided by Miss Utility and/or Utility Companies. Call Miss Utility prior to any construction.
- These properties are shown on tax maps and described in deeds as lying and being in the City of Morgantown, Monongalia County, West Virginia.
- Horizontal positions indicated here have been developed relative to the West Virginia State Plane Coordinate System of 1983 (NAD 83), with bearings shown based on Grid North.
- Vertical positions indicated here have been developed relative to the National Geodetic Vertical Datum of 1988.
- The site is accessible from Walnut Street, Wall Street, and University Avenue, all being public roadways.
- No observed evidence of current earth moving work, building construction, or building additions.
- No observed evidence of site use as a solid waste dump, sump, or landfill.
- No observed evidence of wetlands on the premises.
- Part of Tax Parcel 15, below the existing retaining wall, is located in the 100 year flood plain, (Zone AE), F.E.M.A. Comm-Panel #54061C0114E. Effective date: January 20, 2010. No other part of the Subject Property is located in the 100 year flood plain.
- The total number of striped parking spaces on the subject property is 52, all of which are standard parking spaces.
- All Subject Properties are located in the City of Morgantown, being zoned as the General Business District, B-4. - See Article 1349, City Code of Morgantown, West Virginia.
- The gross land area of all Subject Properties is 82,155 square feet, or 1.88 acres, more or less.
- All mapping information provided on Sheet C-1.2 regarding the location of the West Virginia University PRT are derived from the survey in the field. The average width of the PRT, as located in the field, is 22.6 feet ±. The right of way agreement (DB 714, Pg 545) established a 20' right-of-way width.
- The property shown on the survey is the same as the property described in the Commitment for Title Insurance prepared by Fidelity National Title Insurance Company with Commitment No. M0281250.00168, effective April 1, 2015.

ENCROACHMENTS:

- 1.00' Building encroachment affecting Tax Parcel 14, said encroachment is noted on Sheet C-1.2.
- 2.30' and 1.25' Concrete Retaining Wall encroachment affecting Tax Parcels 14 & 15, said encroachments noted on Sheet C-1.2.
- 2.00' Concrete Porch Encroachment affecting Tax Parcels 8 & 10, said encroachment noted on Sheet C-1.2.

Property Description

Tract 1
Tax Map 26-A, Parcels 6, 7, & 9
Beginning at a magnetic nail set on the western right-of-way of University Avenue, a 66 foot public roadway, said nail being the common corner to lands now or formerly owned by Mode Roman Ltd. Co. (Tax Map 26A, Parcels 1, 2, 3, 4, & 5) (Deed Book 1286, Page 479), said nail also being S. 33° 51' 36" W. 142.51 feet from a City of Morgantown concrete monument; thence with the right-of-way of University Avenue, S. 33° 51' 36" W. 148.51 feet to a magnetic nail set at the intersection of University Avenue and the northern right-of-way of Wall Street, a 13 foot roadway; thence leaving the right-of-way of University Avenue, and with the northern right-of-way Wall Street, N. 56° 08' 24" W. 110.89 feet to point, said point being a common corner to lands now or formerly owned by Sharper Industries Inc. (Tax Map 26A, Parcels 8 & 10) (Deed Book 1079, Page 620); thence with the common line of said Sharper Industries Inc. lands, N. 33° 51' 36" E. 96.97 feet to point; thence N. 55° 22' 24" W. 113.57 feet to a 5/8" rebar with cap set, said rebar being a common corner to lands now or formerly owned by the City of Morgantown (Tax Map 28, Parcel 136) (Deed Book 1161, Page 375); thence with said City of Morgantown lands, N. 55° 22' 24" W. 19.30 feet to a 5/8" rebar with cap set; thence N. 34° 03' 06" E. 87.50 feet to a 5/8" rebar with cap set, said rebar being on the common line of said Mode Roman Ltd. Co. lands; thence with said Mode Roman Ltd. Co. lands, S. 55° 24' 54" E. 149.48 feet to a magnetic nail set; thence S. 33° 51' 36" W. 34.00 feet to a magnetic nail set; thence S. 55° 00' 52" E. 94.01 feet to the point of beginning, containing 0.66 acres, more or less.

Tract 2
Tax Map 26-A, Parcel 13
Beginning at a magnetic nail set at the intersection of the western right-of-way of University Avenue, a 66 foot public roadway, and the southern right-of-way of Wall Street, a 13 foot public roadway; thence with the right-of-way of University Avenue, S. 33° 51' 36" W. 89.95 feet to a point, said point being a common corner to lands now or formerly owned by Vic's Garage Inc. (Tax Map 26A, Parcels 14 & 15) (Deed Book 825, Page 227); thence leaving said University Avenue, and with the common line of said Vic's Garage Inc. lands, N. 56° 08' 24" W. 154.09 feet to a point, said point being a common corner to lands now or formerly owned by Sharper Industries Inc. (Tax Map 26A, Parcels 11 & 12) (Deed Book 1079, Page 620); thence with the common line of said Sharper Industries Inc. lands, N. 33° 51' 36" E. 89.95 feet to a point, said point being on the southern right-of-way of Wall Street, a 13 foot public roadway; thence with the right-of-way of said Wall Street, S. 56° 08' 24" E. 154.09 feet to the point of beginning, containing 0.32 acres, more or less.

Tract 3
Tax Map 26-A, Parcels 14 & 15
Beginning at a magnetic nail set at the intersection of the western right-of-way of University Avenue, a 66 foot public roadway, and the northern right-of-way of Walnut Street, a 66 foot public roadway; thence with the right-of-way of Walnut Street, N. 56° 08' 24" W. 247.50 feet to a 5/8" rebar with cap set, said rebar being on the common line with lands now or formerly owned by the City of Morgantown (Tax Map 28, Parcel 136) (Deed Book 1161, Page 375); thence with the line of the City of Morgantown, N. 33° 51' 36" E. 87.50 feet to a 5/8" rebar with cap set, thence S. 56° 08' 24" E. 247.50 feet to a point, said point being on the western right-of-way of University Avenue; thence with the right-of-way of said University Avenue, S. 33° 51' 36" W. 87.50 feet to the point of beginning, containing 0.50 acres, more or less.

Tract 4
Tax Map 26-A, Parcels 8, 10, 11, & 12
Parcel 1 - Tax Parcels 8 & 10
Beginning at a magnetic nail set at the intersection of the western right-of-way of University Avenue, a 66 foot public roadway, and the northern right-of-way of Wall Street, a 13 foot public roadway; thence with the right-of-way of Wall Street, N. 56° 08' 24" W. 110.89 feet to a point, said point being the TRUE POINT OF BEGINNING; thence continuing with the right-of-way of Wall Street, N. 56° 08' 24" W. 118.20 feet to a magnetic nail set, said nail being on the common line of lands now or formerly owned by the City of Morgantown (Tax Map 28, Parcel 136) (Deed Book 1161, Page 375); thence with line of the City of Morgantown, N. 21° 48' 46" E. 49.08 feet to a point, thence S. 56° 08' 24" E. 14.88 feet to a point; thence N. 33° 51' 36" E. 50.49 feet to a 5/8" rebar with cap set, said rebar being on the common line of lands now or formerly owned by Woodford Oil Company (Tax Map 26A, Parcels 6, 7, & 9) (Deed Book 1061, Page 492); thence with the line of said Woodford Oil Company, S. 55° 22' 24" E. 113.57 feet to a point; thence S. 33° 51' 36" W. 96.97 feet to the beginning, containing 0.26 acres, more or less.

Parcel 2 - Tax Parcels 11 & 12
Beginning at a magnetic nail set at the intersection of the western right-of-way of University Avenue, a 66 foot public roadway, and the southern right-of-way of Wall Street, a 13 foot public roadway; thence with the right-of-way of Wall Street, N. 56° 08' 24" W. 154.09 feet to a point, said point being the TRUE POINT OF BEGINNING; thence leaving said right-of-way of Wall Street, and with the common line of lands now or formerly owned by Cynthia, Victor II, & Gary Solomon, and Vic's Garage Inc. (Tax Map 26A, Parcel 13) (Will Book 137, Page 698), S. 33° 51' 36" W. 89.95 feet to a point, said point being on the common line of lands now or formerly owned by Vic's Garage Inc. (Tax Map 26A, Parcels 14 & 15) (Deed Book 825, Page 227); thence with the line of Vic's Garage Inc., N. 56° 08' 24" W. 70.00 feet to a point, said point being on the common line of lands now or formerly owned by the City of Morgantown (Tax Map 28, Parcel 136) (Deed Book 1161, Page 375); thence with the line of the City of Morgantown, N. 33° 51' 36" E. 89.95 feet to a point, said point being on the southern right-of-way of Wall Street; thence with the said right-of-way of Wall Street, S. 56° 08' 24" E. 70.00 feet to the point of beginning, containing 0.14 acres, more or less.



CTL Engineering of West Virginia, Inc.
510 C Street
1091 Chaplin Hill Road
Morgantown, WV 26501
Phone: 304/292-1135
Fax: 304/296-9302
CHILDSITE PLANNING • SURVEYING
MAPPING • GEOTECHNICAL • TESTING • CONSTRUCTION OBSERVATION • LABORATORY

The Standard at Morgantown
Landmark Collegiate Development, LLC
455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Title Sheet
Third Ward, City of Morgantown, Monongalia County, West Virginia

Date of Survey: 10/20/15

REVIEWS	Approved
Description	GLF
Date	10/02/2015



Drawn By: RDH
Approved By: GLF
Date: 10/02/2015
Scale: 1" = 20'
Project No. 15100025-C MOR
Drawing Name
Sheet No. 1.01

Not for Construction



CTL Engineering of West Virginia, Inc.
 5100 S. Charleston, WV 25303
 1001 Charles Hill Road, Morgantown, WV 26501
 Phone: 304.746.1140 Fax: 304.746.1143
 Phone: 304.292.1135 Fax: 304.296.0302
 CIVIL & SITE PLANNING - SURVEYING & MAPPING - ENVIRONMENTAL ENGINEERING - CONSTRUCTION ADMINISTRATION - LABORATORY

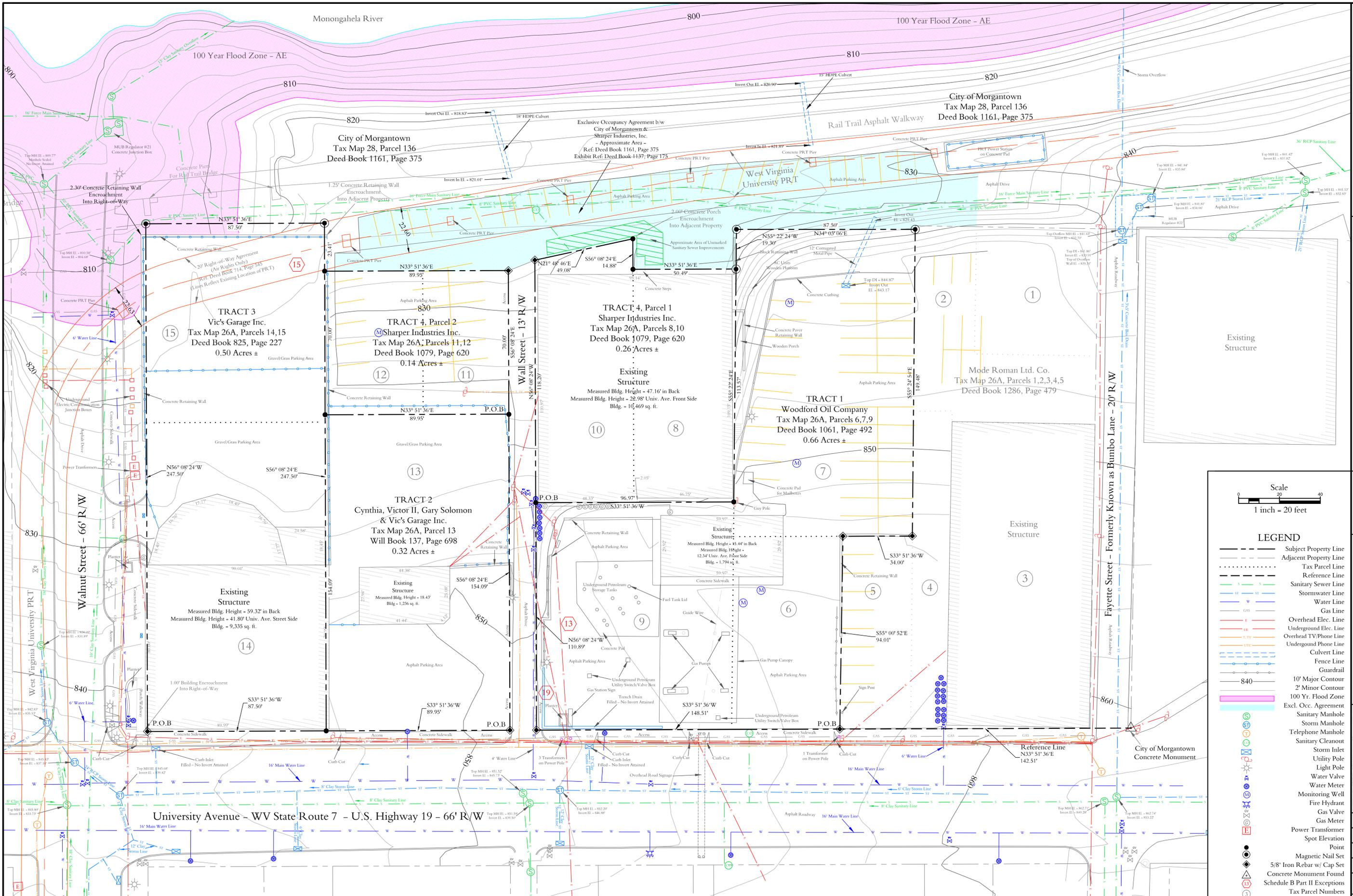
The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Property Survey
 Third Ward, City of Morgantown, Monongalia County, West Virginia



REVISIONS	Description	Changed Page Number
Approved	gcf	
Date	10/21/2015	



Drawn By: DBS
 Approved By: TAD
 Date: 06/26/2015
 Scale: 1" = 20'
 Project No. 15100025-A MOR
 Drawing Name
 Sheet No. 1.02

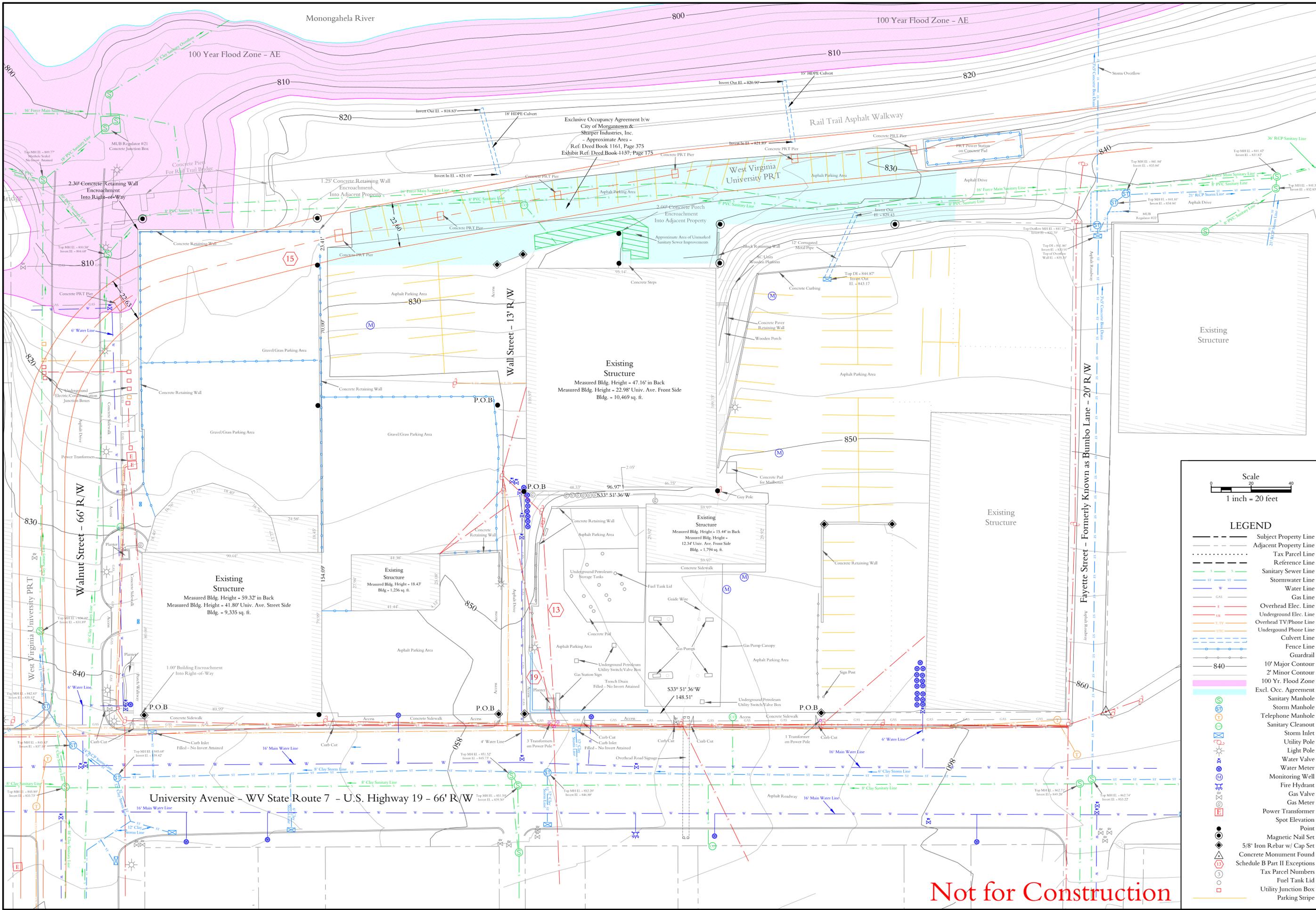


Scale
 1 inch = 20 feet

LEGEND

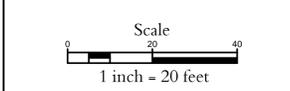
- Subject Property Line
- Adjacent Property Line
- Tax Parcel Line
- Reference Line
- Sanitary Sewer Line
- Stormwater Line
- Water Line
- Gas Line
- Overhead Elec. Line
- Underground Elec. Line
- Overhead TV/Phone Line
- Underground Phone Line
- Culvert Line
- Fence Line
- Guardrail
- 10' Major Contour
- 2' Minor Contour
- 100 Yr. Flood Zone
- Excl. Occ. Agreement
- Sanitary Manhole
- Storm Manhole
- Telephone Manhole
- Sanitary Cleanout
- Storm Inlet
- Utility Pole
- Light Pole
- Water Valve
- Water Meter
- Monitoring Well
- Fire Hydrant
- Gas Valve
- Gas Meter
- Power Transformer
- Spot Elevation
- Point
- Magnetic Nail Set
- 5/8" Iron Rebar w/ Cap Set
- Concrete Monument Found
- Schedule B Part II Exceptions
- Tax Parcel Numbers
- Fuel Tank Lid
- Utility Junction Box
- Parking Stripe

Not for Construction



CTL Engineering of West Virginia, Inc.
 5100 Street
 S. Charleston, WV 25303
 Morgantown, WV 26501
 Phone: 304/746-1140
 Fax: 304/746-1143
 1091 Charles Hill Road
 Morgantown, WV 26501
 Phone: 304/292-1135
 Fax: 304/296-0302

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
 Existing Conditions
 Third Ward, City of Morgantown, Monongalia County, West Virginia



LEGEND

---	Subject Property Line
---	Adjacent Property Line
---	Tax Parcel Line
---	Reference Line
---	Sanitary Sewer Line
---	Stormwater Line
---	Water Line
---	Gas Line
---	Overhead Elec. Line
---	Underground Elec. Line
---	Overhead TV/Phone Line
---	Underground Phone Line
---	Culvert Line
---	Fence Line
---	Guardrail
---	10' Major Contour
---	2' Minor Contour
---	100 Yr. Flood Zone
---	Excl. Occ. Agreement
---	Sanitary Manhole
---	Storm Manhole
---	Telephone Manhole
---	Sanitary Cleanout
---	Sanitary Inlet
---	Utility Pole
---	Light Pole
---	Water Valve
---	Water Meter
---	Monitoring Well
---	Fire Hydrant
---	Gas Valve
---	Gas Meter
---	Power Transformer
---	Spot Elevation
---	Point
---	Magnetic Nail Set
---	5/8" Iron Rebar w/ Cap Set
---	Concrete Monument Found
---	Schedule B Part II Exceptions
---	Tax Parcel Numbers
---	Fuel Tank Lid
---	Utility Junction Box
---	Parking Stripe



REVISIONS	Description	Change/Revision Number
Approved	gcf	
Date:	10/21/15	



Drawn By: DBS
 Approved By: TAD
 Date: 06/26/2015
 Scale: 1" = 20'
 Project No. 15100025-A MOR
 Drawing Name
 Sheet No. 2.01

Not for Construction

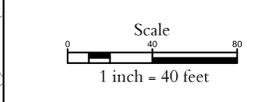
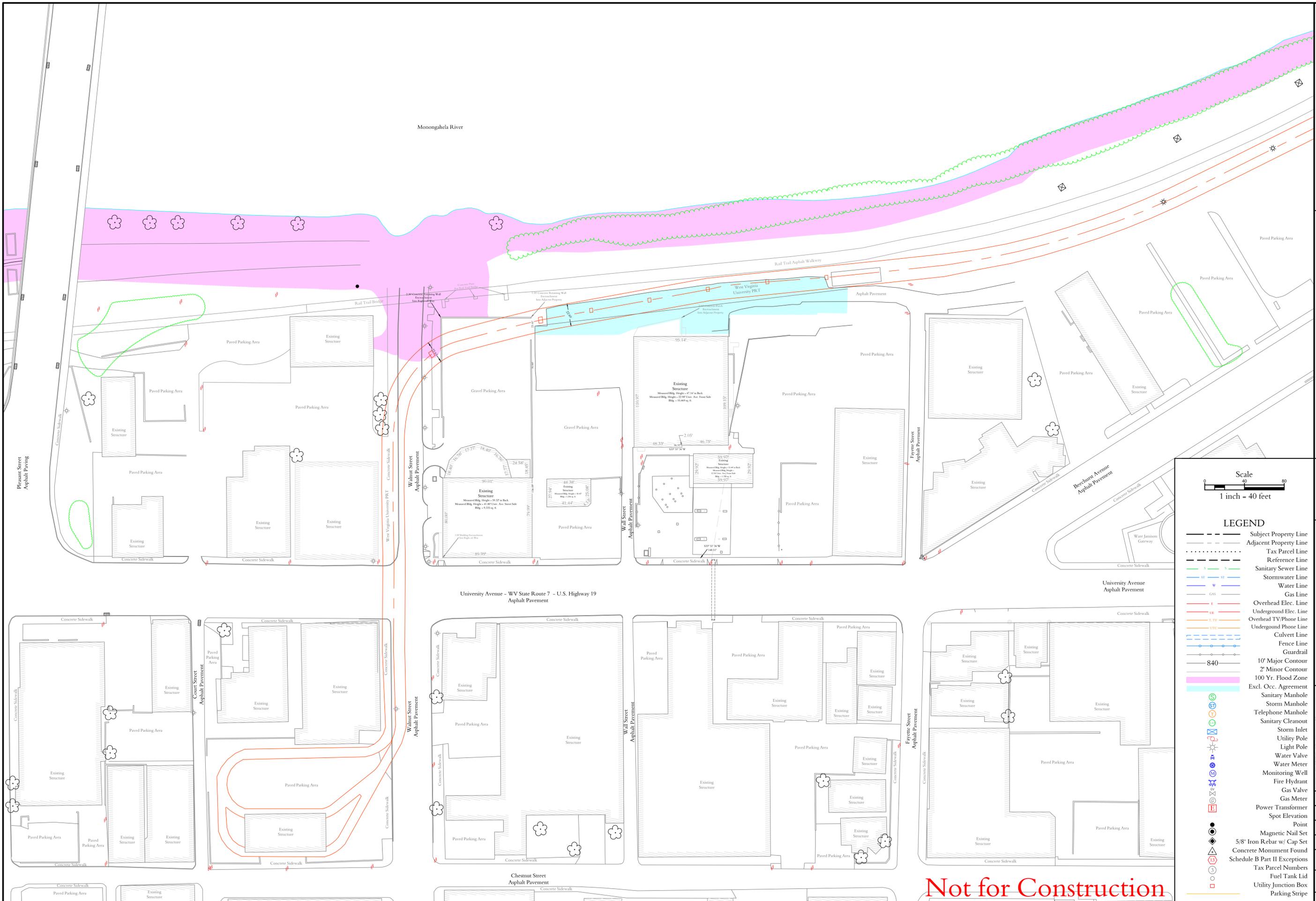


CTL Engineering of West Virginia, Inc.
 5101 C Street
 S. Charleston, WV 25303
 1091 Chaplin Hill Road
 Morgantown, WV 26501
 Phone: 304-746-1140
 Fax: 304-746-1143
 Phone: 304-292-1135
 Fax: 304-296-9302

CIVIL & SITE PLANNING - SURVEYING & MAPPING - UTILITY DESIGN - CONSTRUCTION ADMINISTRATION - LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606

Existing Conditions - 300'
 Third Ward, City of Morgantown, Monongalia County, West Virginia



LEGEND

	Subject Property Line
	Adjacent Property Line
	Tax Parcel Line
	Reference Line
	Sanitary Sewer Line
	Stormwater Line
	Water Line
	Gas Line
	Overhead Elec. Line
	Underground Elec. Line
	Overhead TV/Phone Line
	Underground Phone Line
	Culvert Line
	Fence Line
	Guardrail
	10' Major Contour
	2' Minor Contour
	100 Yr. Flood Zone
	Excl. Occ. Agreement
	Sanitary Manhole
	Storm Manhole
	Telephone Manhole
	Sanitary Cleanout
	Storm Inlet
	Utility Pole
	Light Pole
	Water Valve
	Water Meter
	Monitoring Well
	Fire Hydrant
	Gas Valve
	Gas Meter
	Power Transformer
	Spot Elevation
	Point
	Magnetic Nail Set
	5/8" Iron Rebar w/ Cap Set
	Concrete Monument Found
	Schedule B Part II Exceptions
	Tax Parcel Numbers
	Fuel Tank Lid
	Utility Junction Box
	Parking Stripe



REVISIONS	Description	Date



Drawn By: RDH
 Approved By: GLF
 Date: 10/21/15
 Scale: 1" = 40'
 Project No. 15100025-A MOR
 Drawing Name
 Sheet No. 2.02

Not for Construction

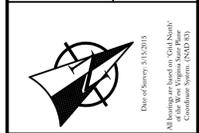


CTL Engineering of West Virginia, Inc.
 510 C Street
 S. Charleston, WV 25303
 Morgantown, WV 26501
 Phone: 304/766-1140
 Fax: 304/766-1143

CHILAS SITE PLANNING SURVEYING & MAPPING
 GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606

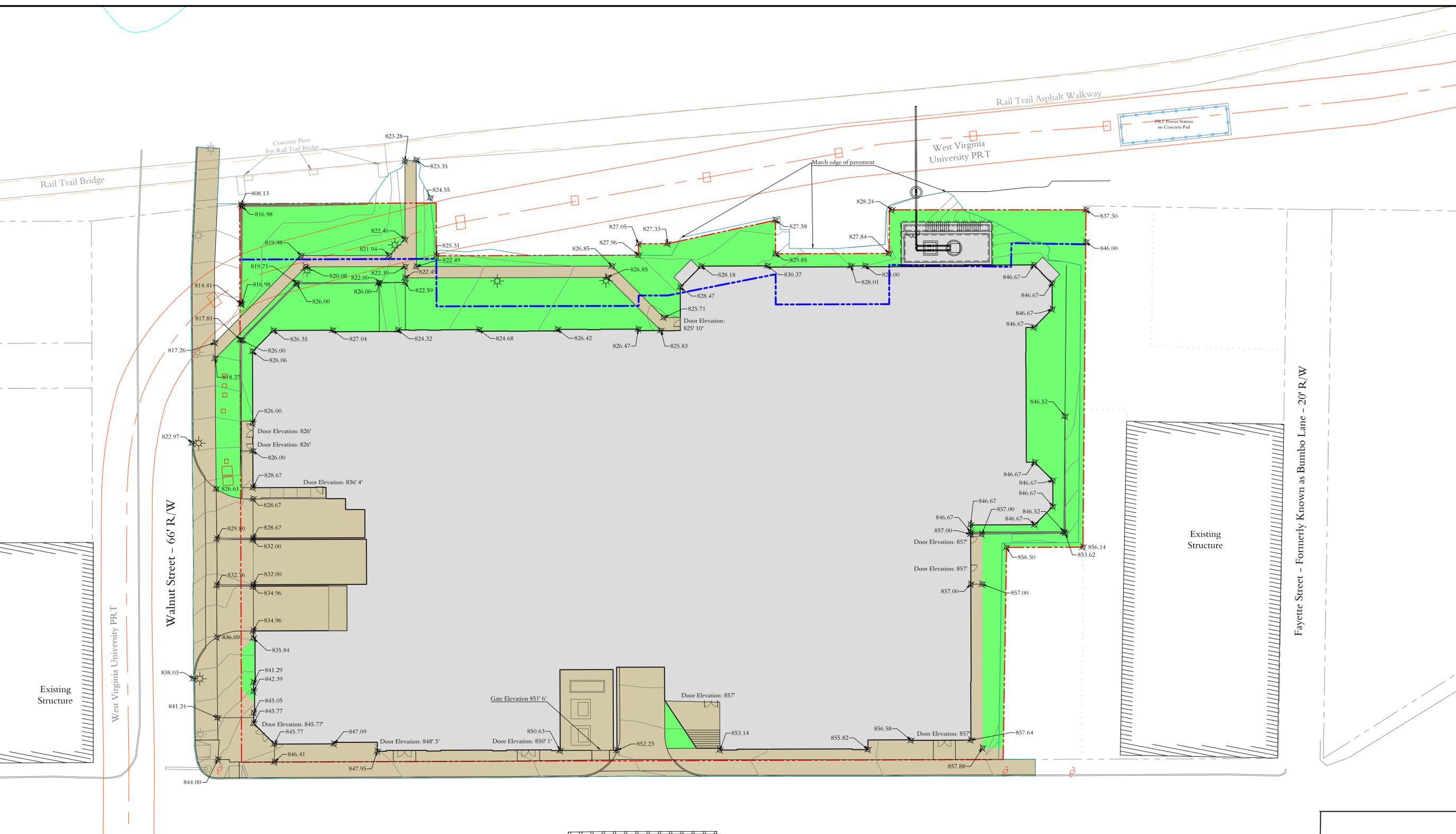
Grading Plan
 Third Ward, City of Morgantown, Monongalia County, West Virginia



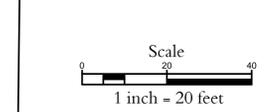
Date	Description	Approved
10/02/2015	Changes Made to Rail Trail Access	GLF



Drawn By: RDH
 Approved By: GLF
 Date: 10/02/2015
 Scale: 1" = 20'
 Project No. 15100025-C MOR
 Drawing Name
 Sheet No. 3.02



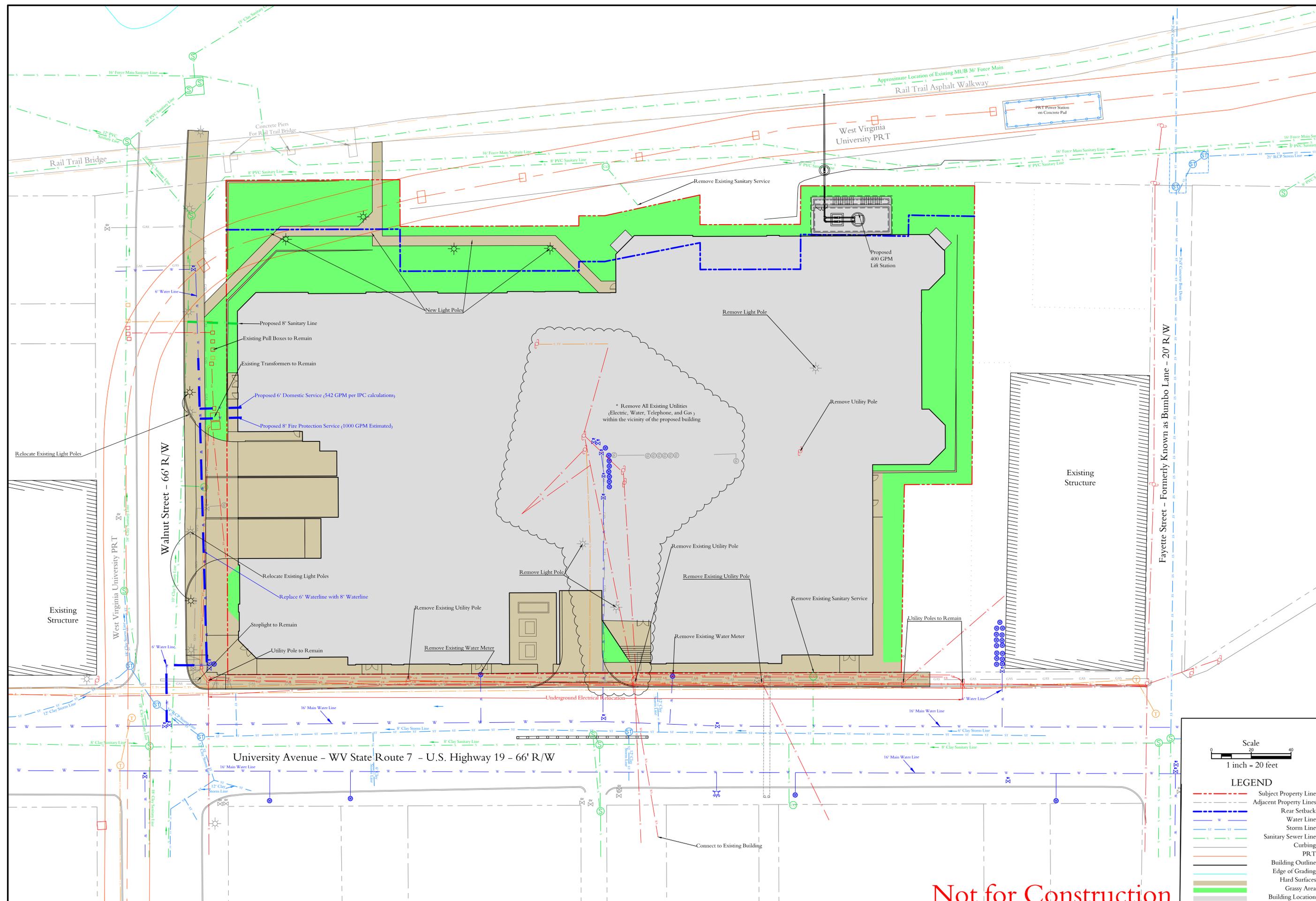
University Avenue - WV State Route 7 - U.S. Highway 19 - 66' R/W



LEGEND

	Subject Property Line
	Adjacent Property Lines
	Rear Setback
	Water Line
	Storm Line
	Sanitary Sewer Line
	Curbing
	PRT
	Building Outline
	Edge of Grading
	Hard Surfaces
	Grassy Area
	Building Location

Not for Construction



Not for Construction

Scale
1 inch = 20 feet

LEGEND

- Subject Property Line
- Adjacent Property Lines
- Rear Setback
- Water Line
- Storm Line
- Sanitary Sewer Line
- Curbing
- Building Outline
- Edge of Grading
- Hard Surfaces
- Grassy Area
- Building Location

CTL Engineering of West Virginia, Inc.
 510 C Street
 S. Charleston, WV 25303
 Phone: 304/766-1140
 Fax: 304/766-1143
 1091 Chaplin Hill Road
 Morgantown, WV 26501
 Phone: 304/292-1135
 Fax: 304/296-5302

CHILKINS SITE PLANNING SURVEYING & ENGINEERING
 GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606

Utility Plan

Third Ward, City of Morgantown, Monongalia County, West Virginia

Date	REVISIONS Description	Approved
10/02/2015	Changes Made Around Rail Trail Access	GLF

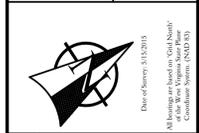
GREGORY L. FOREMAN, P.E. #14188
 C.T.L. ENGINEERING OF WEST VIRGINIA, INC.
 DATE: 10/02/2015

Drawn By: RDH
 Approved By: GLF
 Date: 10/02/2015
 Scale: 1" = 20'
 Project No. 15100025-C MOR
 Drawing Name
 Sheet No. 3.03



CTL Engineering of West Virginia, Inc.
 510 C Street
 Charleston, WV 25303
 Phone: 304.766.1140
 Fax: 304.766.1143
 1091 Chaplin Hill Road
 Morgantown, WV 26501
 Phone: 304.292.1135
 Fax: 304.296.5302
 CIVIL, SITE PLANNING, SURVEYING & MAPPING
 GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Storm Water Plan
 Third Ward, City of Morgantown, Monongalia County, West Virginia

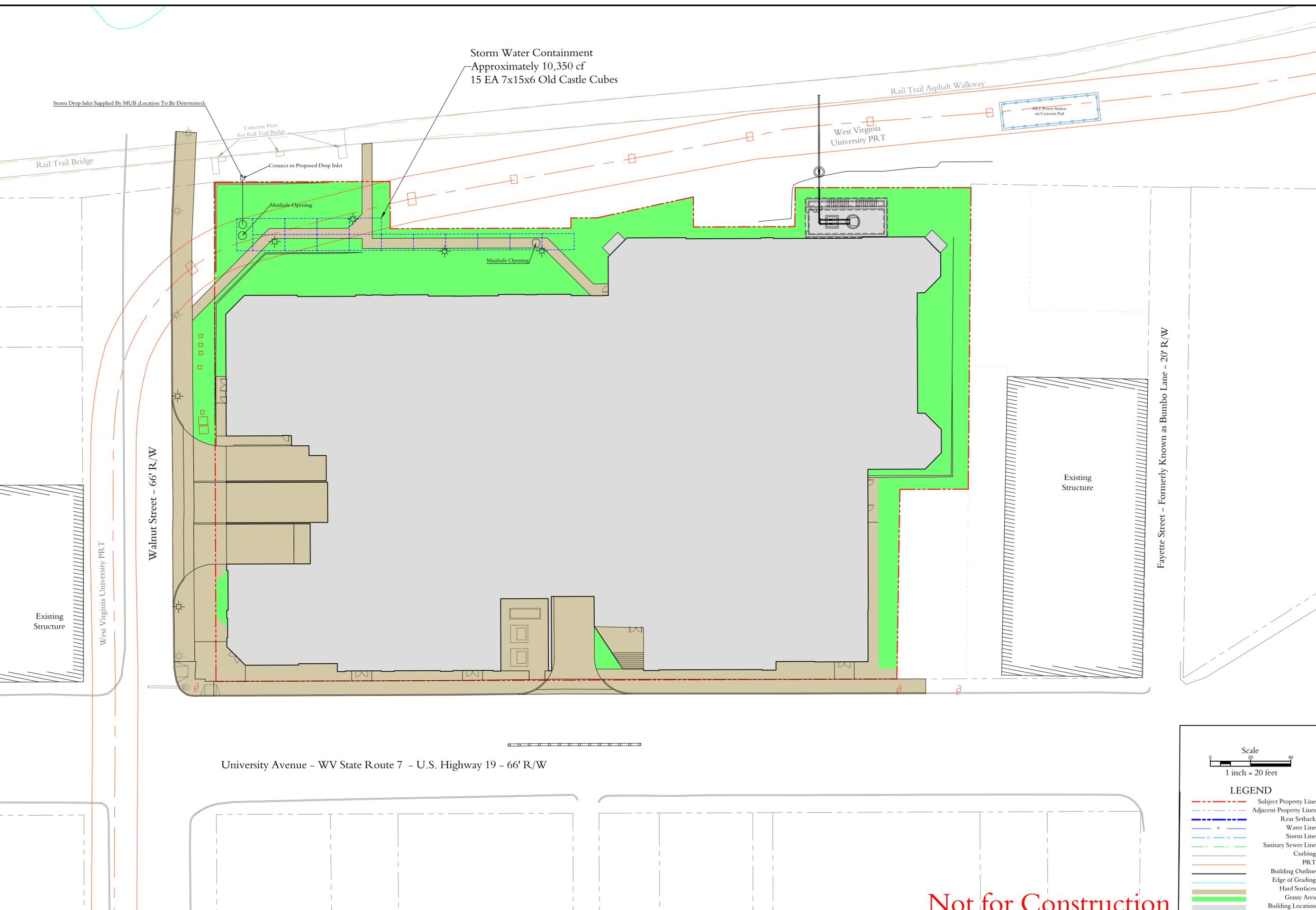


REVISIONS	
Date	Description
10/02/2015	Changes Made to Rail Trail Access
Approved	GLF



Drawn By: RDH
 Approved By: GLF
 Date: 10/02/2015
 Scale: 1" = 20'
 Project No. 15100025-C MOR
 Drawing Name
 Sheet No. 3.04

Storm Water Containment
 Approximately 10,350 cf
 15 EA 7x15x6 Old Castle Cubes



Scale
 1 inch = 20 feet

LEGEND

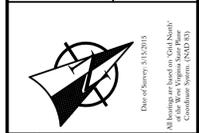
- - - Subject Property Line
- - - Adjacent Property Lines
- - - Rear Setback
- - - Water Line
- - - Storm Line
- - - Sanitary Sewer Line
- - - Curbing
- - - PRT
- - - Building Outline
- - - Edge of Grading
- - - Hard Surfaces
- - - Grassy Area
- - - Building Location

Not for Construction



CTL Engineering of West Virginia, Inc.
 510 C Street
 Charleston, WV 25303
 Phone: 304.766.1140
 Fax: 304.766.1143
 1091 Chaplin Hill Road
 Morgantown, WV 26501
 Phone: 304.292.1135
 Fax: 304.296.5302
 CIVIL, SITE PLANNING, SURVEYING & MAPPING
 GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION LABORATORY

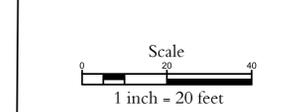
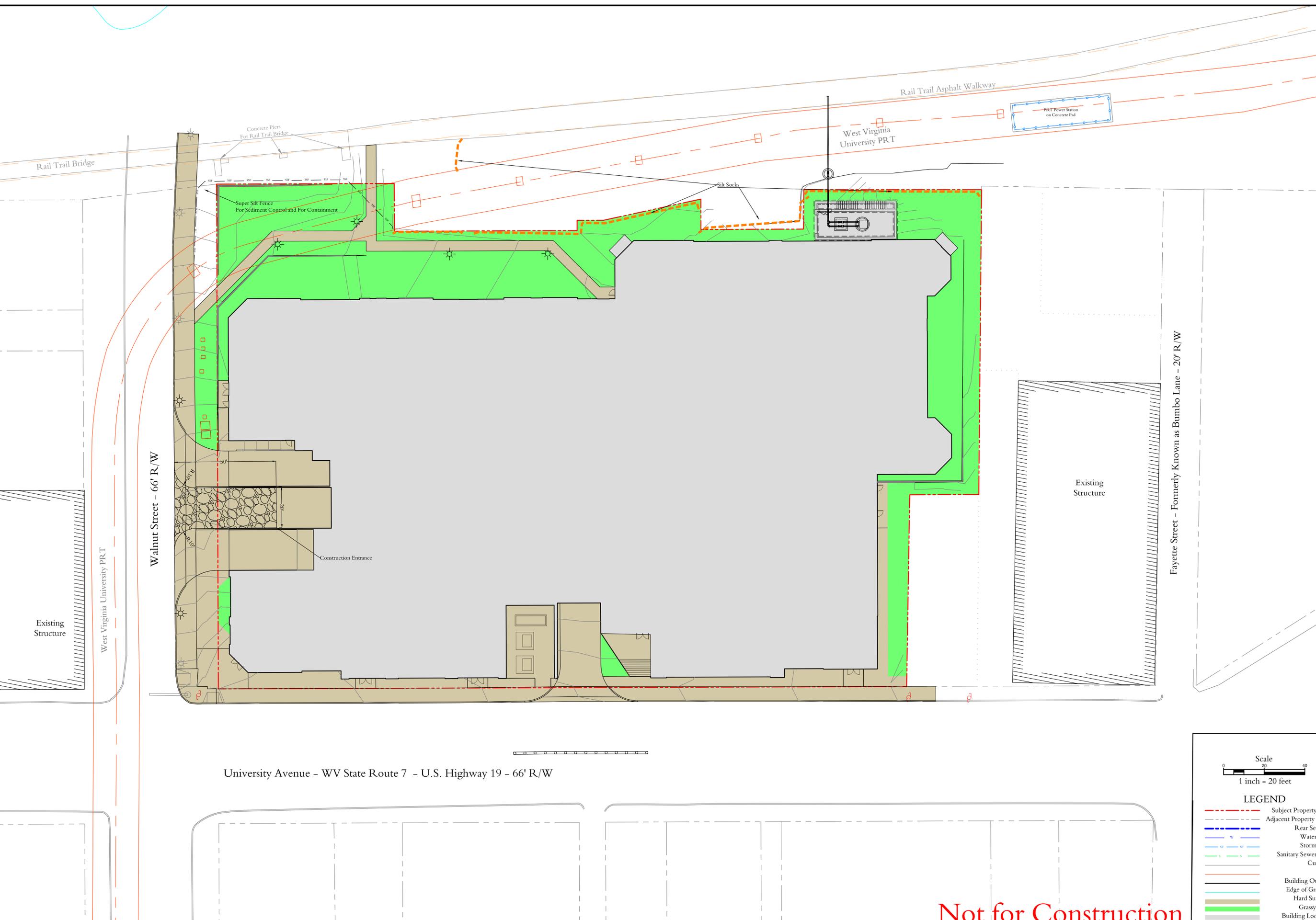
The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Erosion and Sediment Control Plan
 Third Ward, City of Morgantown, Monongalia County, West Virginia



Date	Description	Approved
10/02/2015	Changes Made to Rail Trail Access	GLF



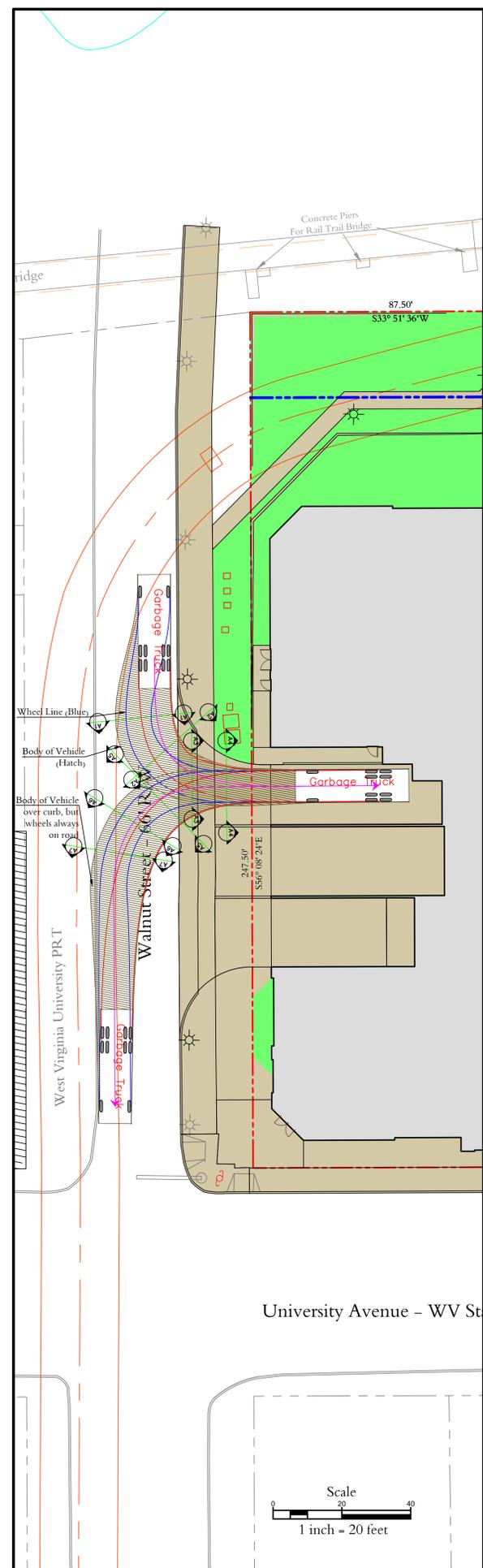
Drawn By: RDH
 Approved By: GLF
 Date: 10/02/2015
 Scale: 1" = 20'
 Project No. 15100025-C MOR
 Drawing Name
 Sheet No. 3.05



LEGEND

--- (Red Dashed)	Subject Property Line
--- (Black Dashed)	Adjacent Property Lines
--- (Blue Dashed)	Rear Setback
--- (Blue Dashed)	Water Line
--- (Red Dashed)	Storm Line
--- (Green Dashed)	Sanitary Sewer Line
--- (Black Dashed)	Curbing
--- (Black Dashed)	PRT
--- (Black Dashed)	Building Outline
--- (Black Dashed)	Edge of Grading
--- (Blue Dashed)	Hard Surfaces
--- (Green Dashed)	Grassy Area
--- (Red Dashed)	Building Location

Not for Construction



Garbage Truck Maneuvers on Walnut Street Calculations

Gross Vehicle Weight (GVW)	65,000 lbs
Weight on Each Drive Wheel (Ww)	16,000 lbs
Radius of Wheel / Tire (Rw)	21 in
Desired Top Speed (Vmax)	5 mph 7.33 ft/sec
Desired Acceleration Time (ta)	5 sec
Maximum Incline Angle (α) % Slope	13 7.45 degrees
Worst Working Surface Friction (Crr)	0.025 2" Snow

Step 1 Determine Rolling Resistance
 Rolling Resistance (RR) is the force necessary to propel a vehicle over a particular surface. The worst possible surface type to be encountered by the vehicle should be factored into the equation.

$$RR [lbs] = GVW [lbs] \times Crr$$

$$RR [lbs] = 65,000 \times 0.025$$

$$RR = 1,625 \text{ lbs}$$

Step 2 Determine Grade Resistance
 Grade resistance (GR) is the amount of force necessary to move a vehicle up a slope or "grade". This calculation must be made using the maximum angle or grade the vehicle will be expected to climb in normal operations.

$$GR [lbs] = GVW [lbs] \times \sin(\alpha)$$

$$GR [lbs] = 65,000 \times \sin 7.45$$

$$GR = 8,450 \text{ lbs}$$

Step 3 Determine Acceleration Force
 Acceleration Force (FA) is the force necessary to accelerate from a stop to maximum speed in a desired time.

$$FA [lbs] = GVW [lbs] \times Vmax [ft/sec] \div (32.2 [ft/sec^2] \times ta [sec])$$

$$FA [lbs] = 65,000 \times 7.3 \div (32.2 [ft/sec^2] \times 5 \text{ sec})$$

$$FA = 2,961 \text{ lbs}$$

Step 4 Determine Total Tractive Effort
 The Total Tractive Effort (TTE) is the sum of the forces calculated in steps 1, 2, and 3.

$$TTE [lbs] = RR [lbs] + GR [lbs] + FA [lbs]$$

$$TTE [lbs] = 1,625 + 8,450 + 2,961$$

$$TTE = 13,036 \text{ lbs}$$

Step 5 Determine Wheel Motor Torque
 To verify will perform as designed in regards to tractive effort and acceleration, it is necessary to calculate the required wheel torque (Tw) based on the tractive effort

RF is the "resistance factor" for the frictional losses between wheels, axels, and drag. Typical values range between 1.1 and 1.15 (or 10% to 15%)

$$Tw [lb-in] = TTE [lbs] \times Rw [in] \times RF$$

$$Tw [lb-in] = 13,036 \times 21 \times 1.1$$

$$Tw = 301,124 \text{ lb-in}$$

$$Tw = 25,094 \text{ ft-lb}$$

Step 6 Verification of Maneuvers
 To verify the vehicle can transmit the required torque from the drive wheels to the ground. The maximum tractive torque (MTT) a wheel can transmit is equal to the normal load times the friction coefficient between the wheel and the ground times the radius of the drive wheel.

μ = friction coefficient between the wheel and the ground (Rubber on Wet Asphalt 0.25 to 0.75)

$$MTT [lb-in] = Ww [lbs] \times \mu \times Rw$$

$$MTT [lb-in] = 16,000 \times 0.5 \times 21$$

$$MTT = 168,000 \text{ lb-in}$$

$$MTT = 14,000 \text{ ft-lb}$$

The total wheel torque calculated in Step 5 must be less than the sum of the Maximum Tractive Torques in Step 6 for all drive wheels or slipping will occur

Tw [ft-lbs]	<	MTT [ft-lbs]	ok
25,094	<	56,000	

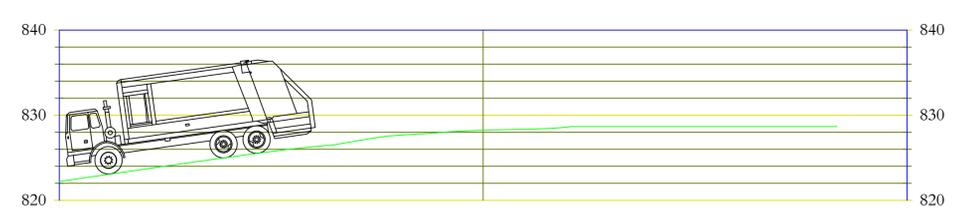
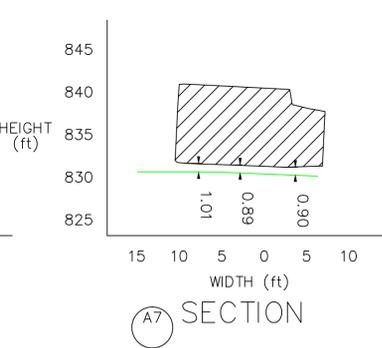
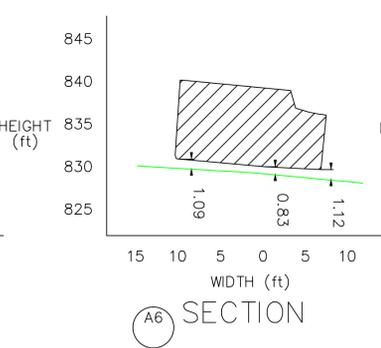
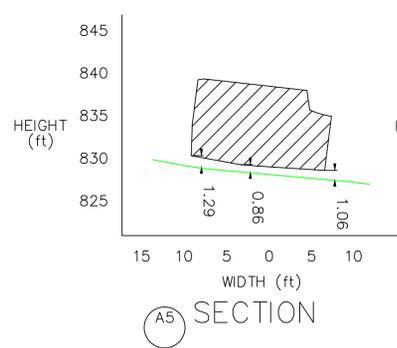
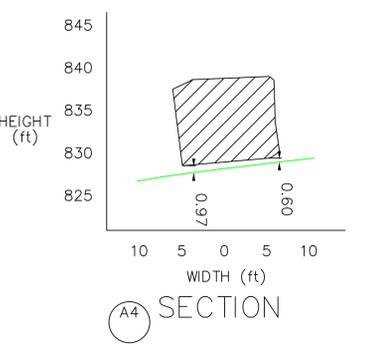
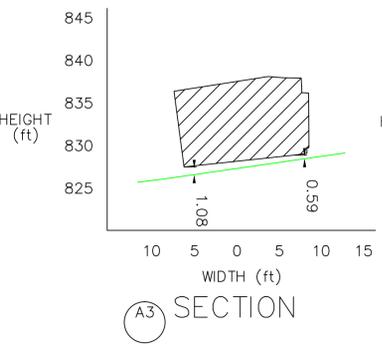
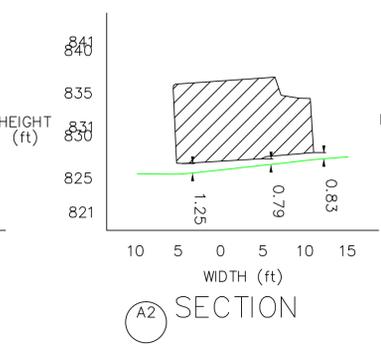
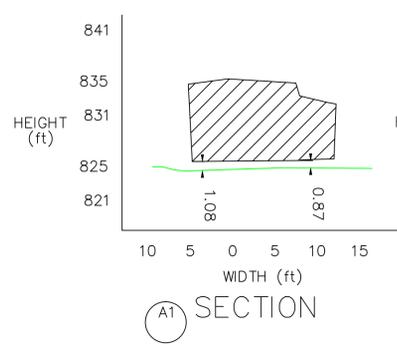
Step 8 Vehicle Performance Analysis
 The design vehicle shall be analyzed to determine if it is capable of performing the maneuvers sufficiently. The performance of the design vehicle (Wheel Torque) can be determined by multiplying Engine Torque (Et) by Starting Gear Ratio (SGR) by Drive Gear Ratio (DGR).

Engine Torque (Et)	1,000 ft-lb
Starting Gear Ratio (SGR)	13.63 : 1
Drive Gear Ratio (DGR)	4.11 : 1

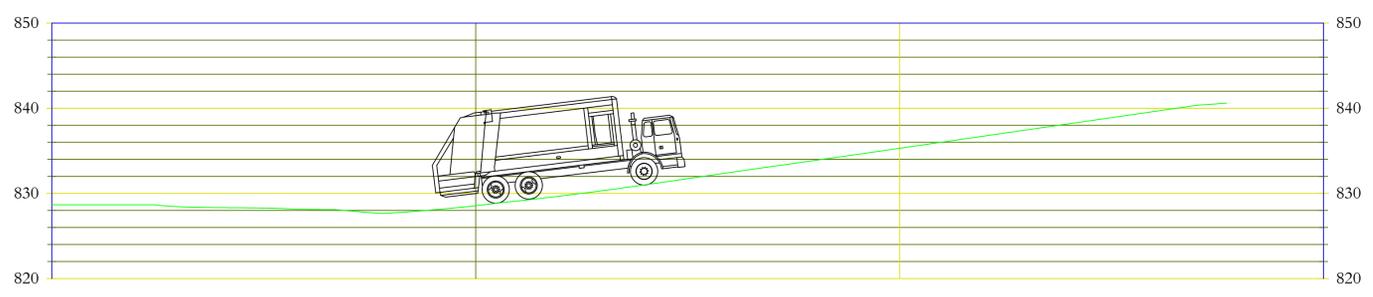
$$WT [ft-lbs] = Et [ft-lbs] \times SGR \times DGR$$

$$WT [ft-lbs] = 1,000 \times 13.5 \times 4.11$$

$$WT = 56,019 \text{ ft-lb}$$



GARBAGE TRUCK IN REVERSE
 Horz: 1"=10'
 Vert: 1"=10'

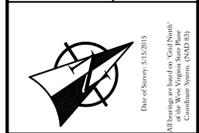


GARBAGE TRUCK IN FORWARD
 Horz: 1"=10'
 Vert: 1"=10'

Not for Construction

CTL Engineering of West Virginia, Inc.
 510 C Street
 S. Charleston, WV 25303
 Phone: 304/766-1140
 Fax: 304/766-1140
 1091 Chapel Hill Road
 Morgantown, WV 26501
 Phone: 304/292-1135
 Fax: 304/296-5302
 CIVIL & SITE PLANNING • SURVEYING & MAPPING • GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION • LABORATORY

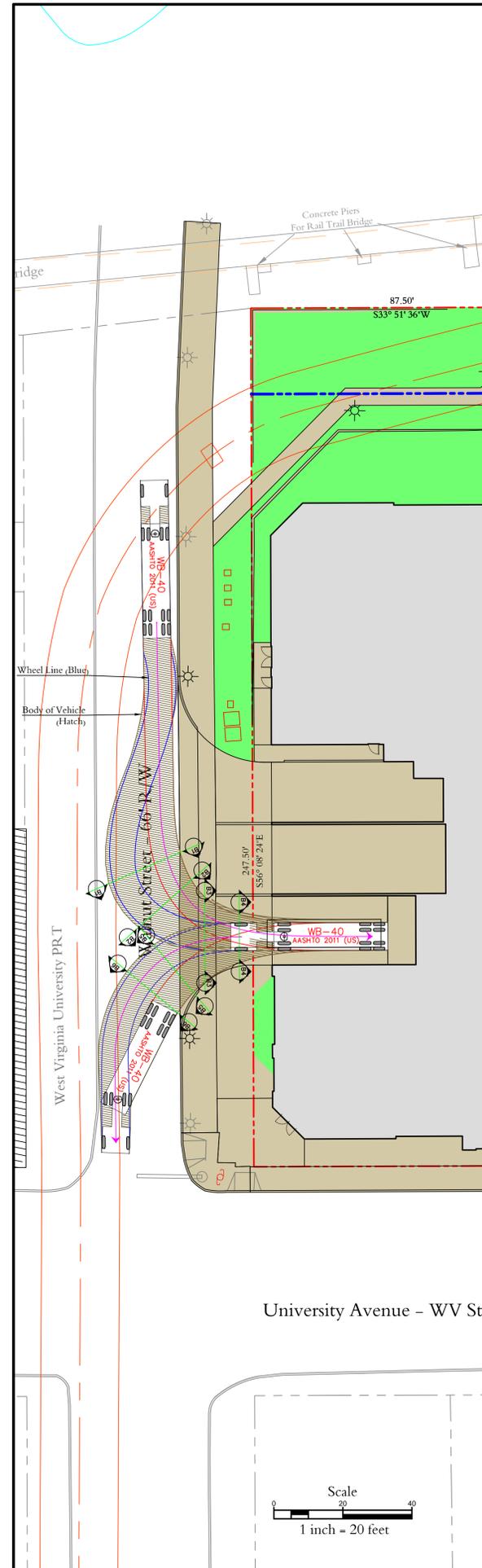
The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Turning Maneuvers - Garbage Truck
 Third Ward, City of Morgantown, Monongalia County, West Virginia



REVISIONS	Description	Approved	Date

GREGORY L. FOREMAN, P.E. #14185
 STATE OF WEST VIRGINIA
 PROFESSIONAL ENGINEER
 DATE: 10/21/2015

Drawn By:	RDH
Approved By:	GLF
Date:	10/21/2015
Scale:	
Project No.	15100025-C MOR
Drawing Name	
Sheet No.	3.07



WB-40 Backing Maneuvers on Walnut Street Calculations

Gross Vehicle Weight (GVW)	80,000 lbs
Weight on Each Drive Wheel (Ww)	16,000 lbs
Radius of Wheel / Tire (Rw)	21 in
Desired Top Speed (Vmax)	5 mph 7.33 ft/sec
Desired Acceleration Time (ta)	5 sec
Maximum Incline Angle (α)	13 7.45 degrees
Worst Working Surface Friction (Crr)	0.025 2" Snow

Step 1 Determine Rolling Resistance
 Rolling Resistance (RR) is the force necessary to propel a vehicle over a particular surface. The worst possible surface type to be encountered by the vehicle should be factored into the equation.

$$RR [lbs] = GVW [lbs] \times Crr$$

$$RR [lbs] = 80,000 \times 0.025$$

$$RR = 2,000 \text{ lbs}$$

Step 2 Determine Grade Resistance
 Grade resistance (GR) is the amount of force necessary to move a vehicle up a slope or "grade". This calculation must be made using the maximum angle or grade the vehicle will be expected to climb in normal operations.

$$GR [lbs] = GVW [lbs] \times \sin(\alpha)$$

$$GR [lbs] = 80,000 \times \sin(7.45)$$

$$GR = 10,400 \text{ lbs}$$

Step 3 Determine Acceleration Force
 Acceleration Force (FA) is the force necessary to accelerate from a stop to maximum speed in a desired time.

$$FA [lbs] = GVW [lbs] \times Vmax [ft/sec] \div (32.2 [ft/sec^2] \times ta [sec])$$

$$FA [lbs] = 80,000 \times 7.3 \div (32.2 \text{ ft/sec}^2 \times 5 \text{ sec})$$

$$FA = 3,644 \text{ lbs}$$

Step 4 Determine Total Tractive Effort
 The Total Tractive Effort (TTE) is the sum of the forces calculated in steps 1, 2, and 3.

$$TTE [lbs] = RR [lbs] + GR [lbs] + FA [lbs]$$

$$TTE [lbs] = 2,000 + 10,400 + 3,644$$

$$TTE = 16,044 \text{ lbs}$$

Step 5 Determine Wheel Motor Torque
 To verify will perform as designed in regards to tractive effort and acceleration, it is necessary to calculate the required wheel torque (Tw) based on the tractive effort

RF is the "resistance factor" for the frictional losses between wheels, axels, and drag. Typical values range between 1.1 and 1.15 (or 10% to 15%)

$$Tw [lb-in] = TTE [lbs] \times Rw [in] \times RF$$

$$Tw [lb-in] = 16,044 \times 21 \times 1.1$$

$$Tw = 370,614 \text{ lb-in}$$

$$Tw = 30,884 \text{ ft-lb}$$

Step 6 Verification of Maneuvers
 To verify the vehicle can transmit the required torque from the drive wheels to the ground. The maximum tractive torque (MTT) a wheel can transmit is equal to the normal load times the friction coefficient between the wheel and the ground times the radius of the drive wheel.

μ = friction coefficient between the wheel and the ground (Rubber on Wet Asphalt 0.25 to 0.75)

$$MTT [lb-in] = Ww [lbs] \times \mu \times Rw$$

$$MTT [lb-in] = 16,000 \times 0.5 \times 21$$

$$MTT = 168,000 \text{ (Posi Tract)} \times 336,000 \text{ lb-in}$$

$$MTT = 168,000 \text{ (Posi Tract)} \times 56,000 \text{ ft-lb}$$

Step 7 The total wheel torque calculated in Step 5 must be less than the sum of the Maximum Tractive Torques in Step 6 for all drive wheels or slipping will occur

Tw [ft-lbs]	<	MTT [ft-lbs]	ok
30,884	<	56,000	ok

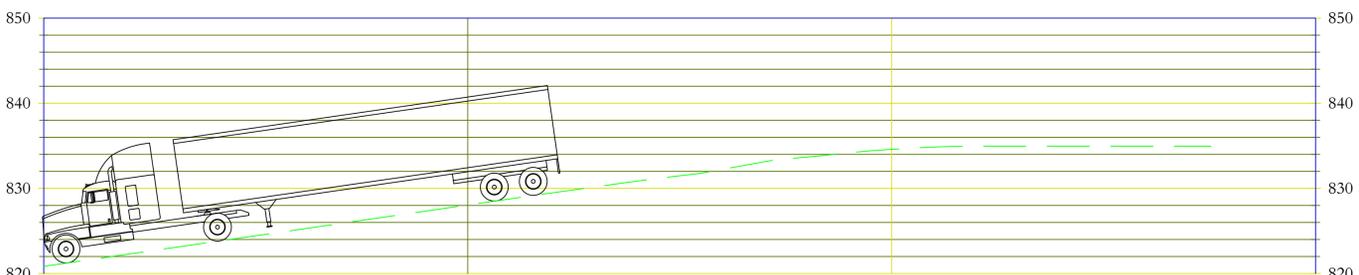
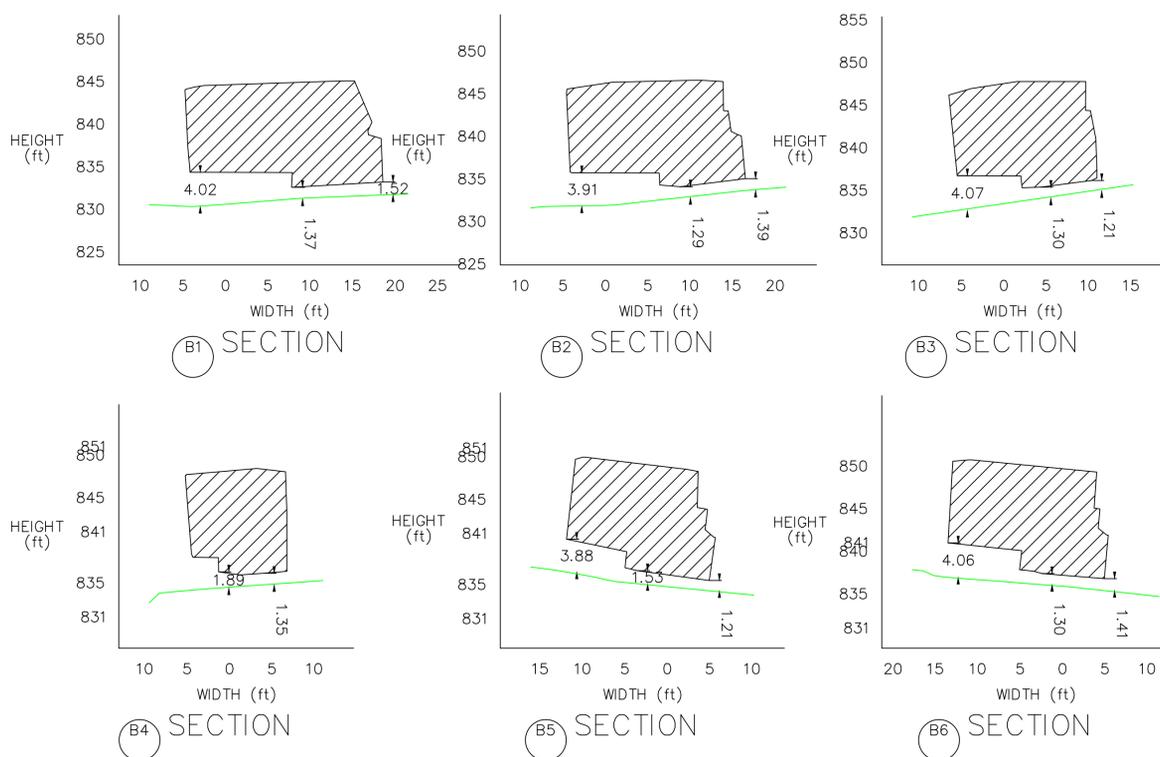
Step 8 Vehicle Performance Analysis
 The design vehicle shall be analyzed to determine if it is capable of performing the maneuvers sufficiently. The performance of the design vehicle (Wheel Torque) can be determined by multiplying Engine Torque (Et) by Starting Gear Ratio (SGR) by Drive Gear Ratio (DGR).

Engine Torque (Et)	1,000 ft-lb
Starting Gear Ratio (SGR)	13.63 : 1
Drive Gear Ratio (DGR)	4.11 : 1

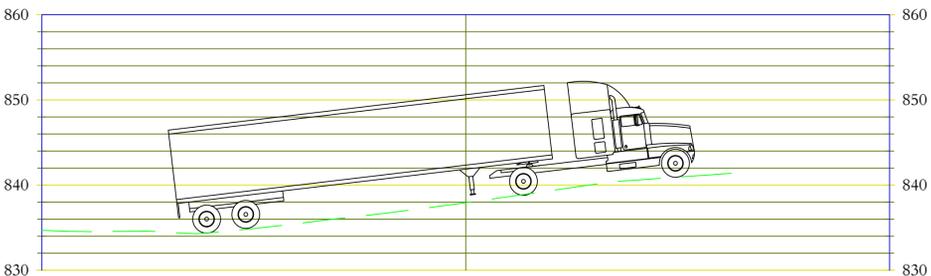
$$WT [ft-lbs] = Et [ft-lbs] \times SGR \times DGR$$

$$WT [ft-lbs] = 1,000 \times 13.5 \times 4.11$$

$$WT = 56,019 \text{ ft-lb}$$



WB-40 REVERSE
 Horz: 1"=10'
 Vert: 1"=10'



WB-40 FORWARD
 Horz: 1"=10'
 Vert: 1"=10'

Not for Construction

CTL Engineering of West Virginia, Inc.
 510 C Street
 S. Charleston, WV 25303
 Phone: 304/766-1140
 Fax: 304/766-1143
 1091 Chaplin Hill Road
 Morgantown, WV 26501
 Phone: 304/292-1135
 Fax: 304/296-5302
 CIVIL, SITE PLANNING, SURVEYING & ENGINEERING
 GEOTECHNICAL TESTING & CONSTRUCTION OBSERVATION LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606

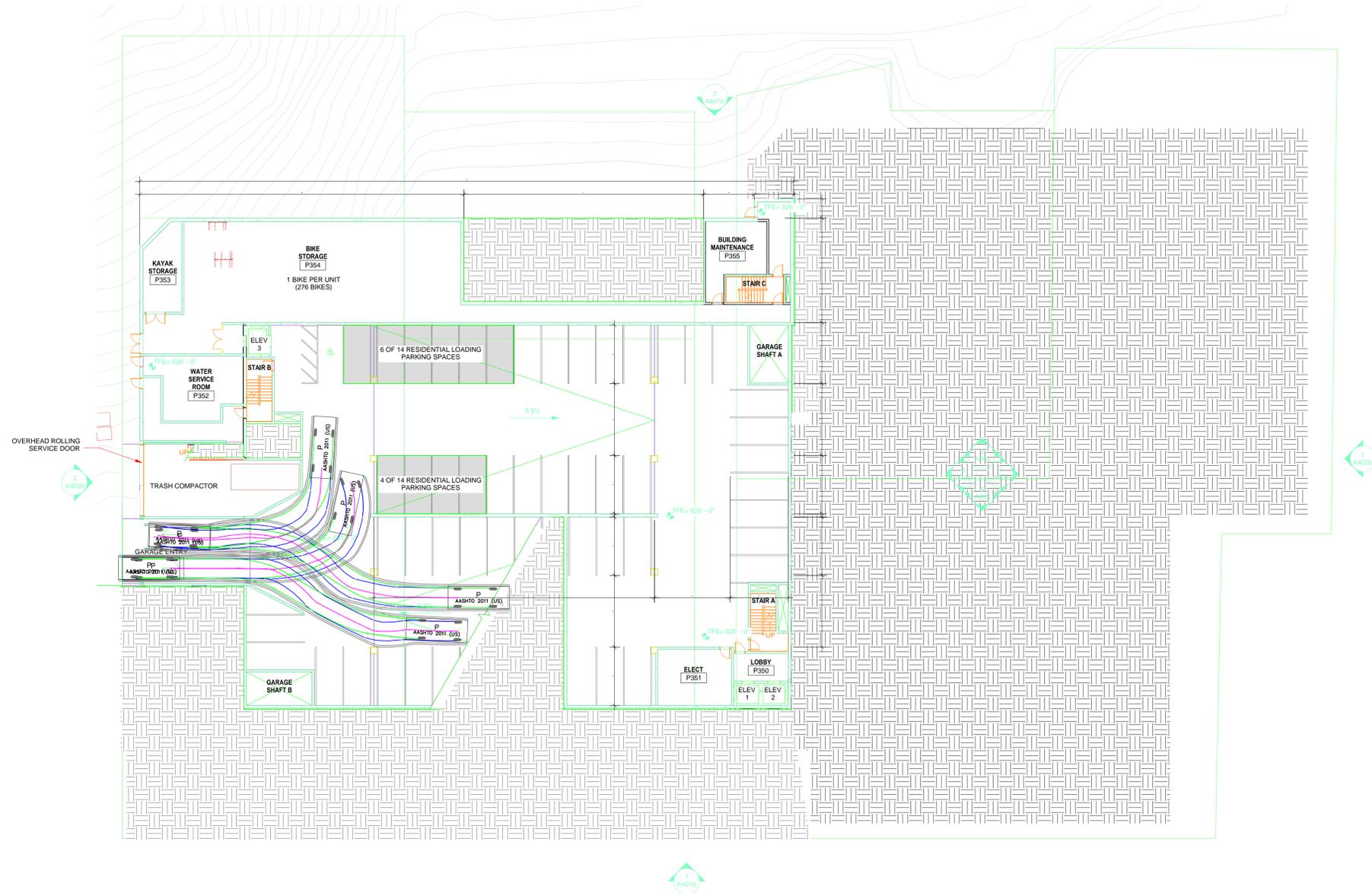
Turning Maneuvers - WB-40
 Third Ward, City of Morgantown, Monongalia County, West Virginia



REVISIONS	Description	Date

GREGORY L. FOREMAN, P.E. #14185
 CTL ENGINEERING OF WEST VIRGINIA, INC.
 DATE: 10/21/2015

Drawn By:	RDH
Approved By:	GLF
Date:	10/21/2015
Scale:	
Project No.	15100025-C MOR
Drawing Name	
Sheet No.	3.08



CTL Engineering of West Virginia, Inc.
 1091 Chapel Hill Road Morgantown, WV 26501
 Phone: 304/292-1135 Fax: 304/292-5302
 510 C Street S. Charleston, WV 25303
 Phone: 304/766-1140 Fax: 304/766-1143
 CIVIL SITE PLANNING • SURVEYING • MECHANICAL • ELECTRICAL • PLUMBING • GEOTECHNICAL TESTING • CONSTRUCTION OBSERVATION • LABORATORY

The Standard at Morgantown
 Landmark Collegiate Development, LLC
 455 Epps Bridge Parkway, Bldg. 100, Suite 201, Athens, GA 30606
Turning Maneuvers - Parking Entrance
 Third Ward, City of Morgantown, Monongalia County, West Virginia

Date of Survey: 5/12/2015

REVISIONS	
Date	Description



Drawn By: MSG
 Approved By: GLF
 Date: 10/21/2015
 Scale:
 Project No. 15100025-C MOR
 Drawing Name
 Sheet No. 3.09