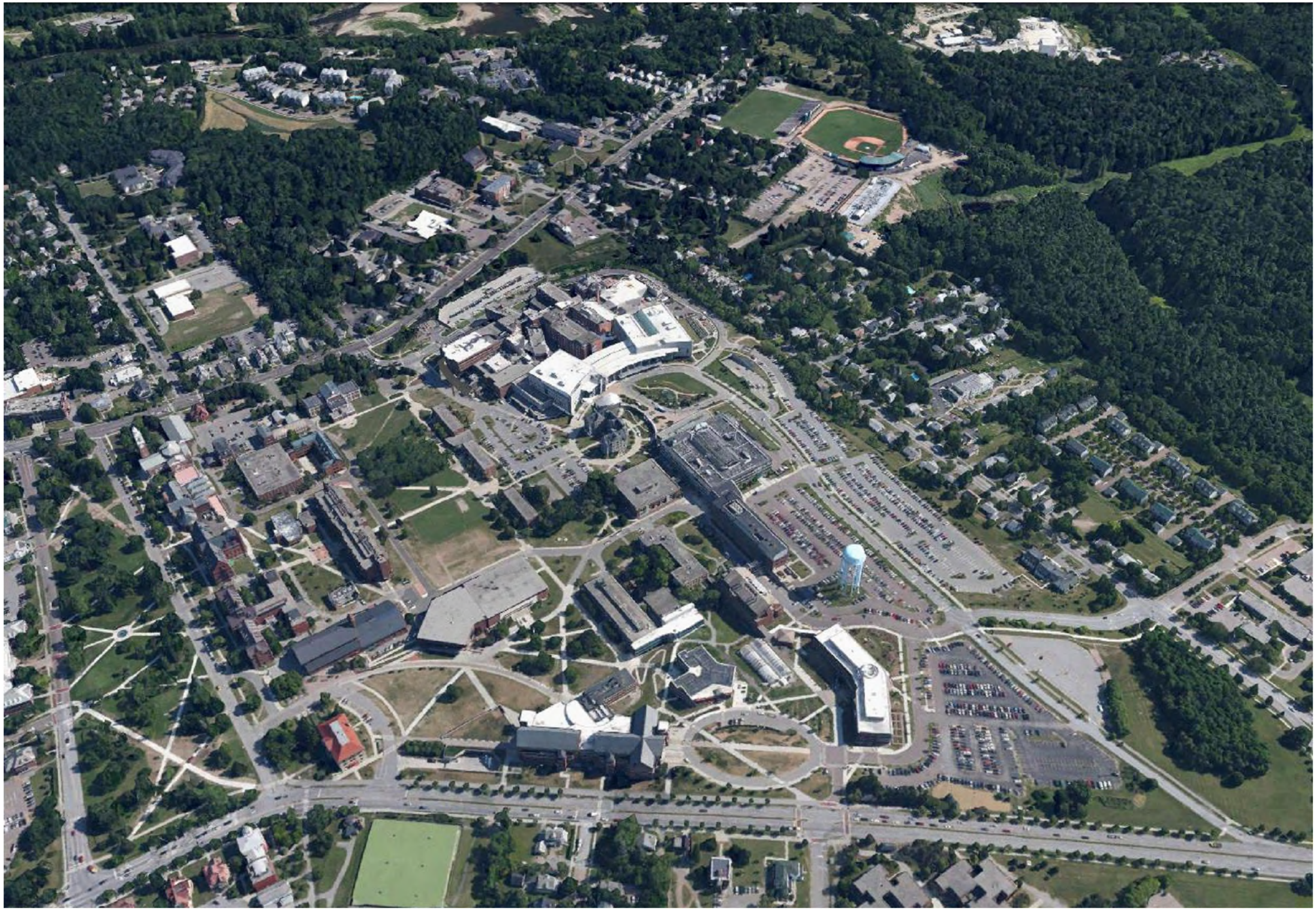


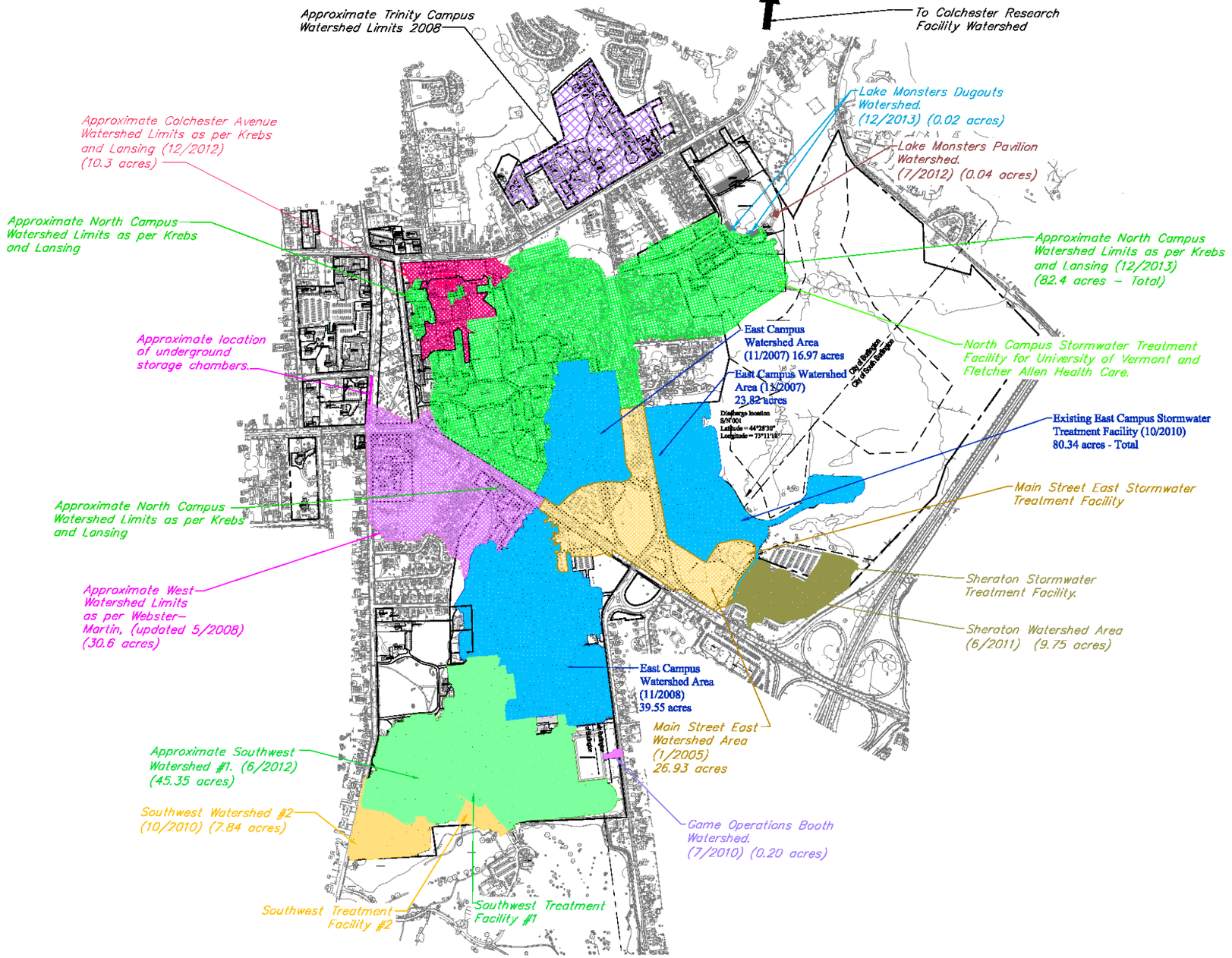
SKETCH PLAN REVIEW
INPATIENT BUILDING PROJECT

12 MARCH 2014

EXISTING SITE - AERIAL VIEW

Fletcher Allen Health Care
Burlington, VT

morris switzer
environments for health



The UNIVERSITY of VERMONT
UVM

University of Vermont
CAMPUS PLANNING
109 SOUTH PROSPECT
BURLINGTON, VERMONT 05405
(802) 656-3208

CONSULTANTS
CIVIL ENGINEER
K&L Krebs & Lansing Consulting Engineers, Inc.
184 Main Street, Suite 301
Colchester, VT 05446
T. (802) 878-0576
F. (802) 878-9615

Project:
UNIVERSITY of VERMONT

Project No.
Scale 1" = 400'
Drawn by DMR
Checked by WHN
Date 12/09/2013

Revisions
No. Date

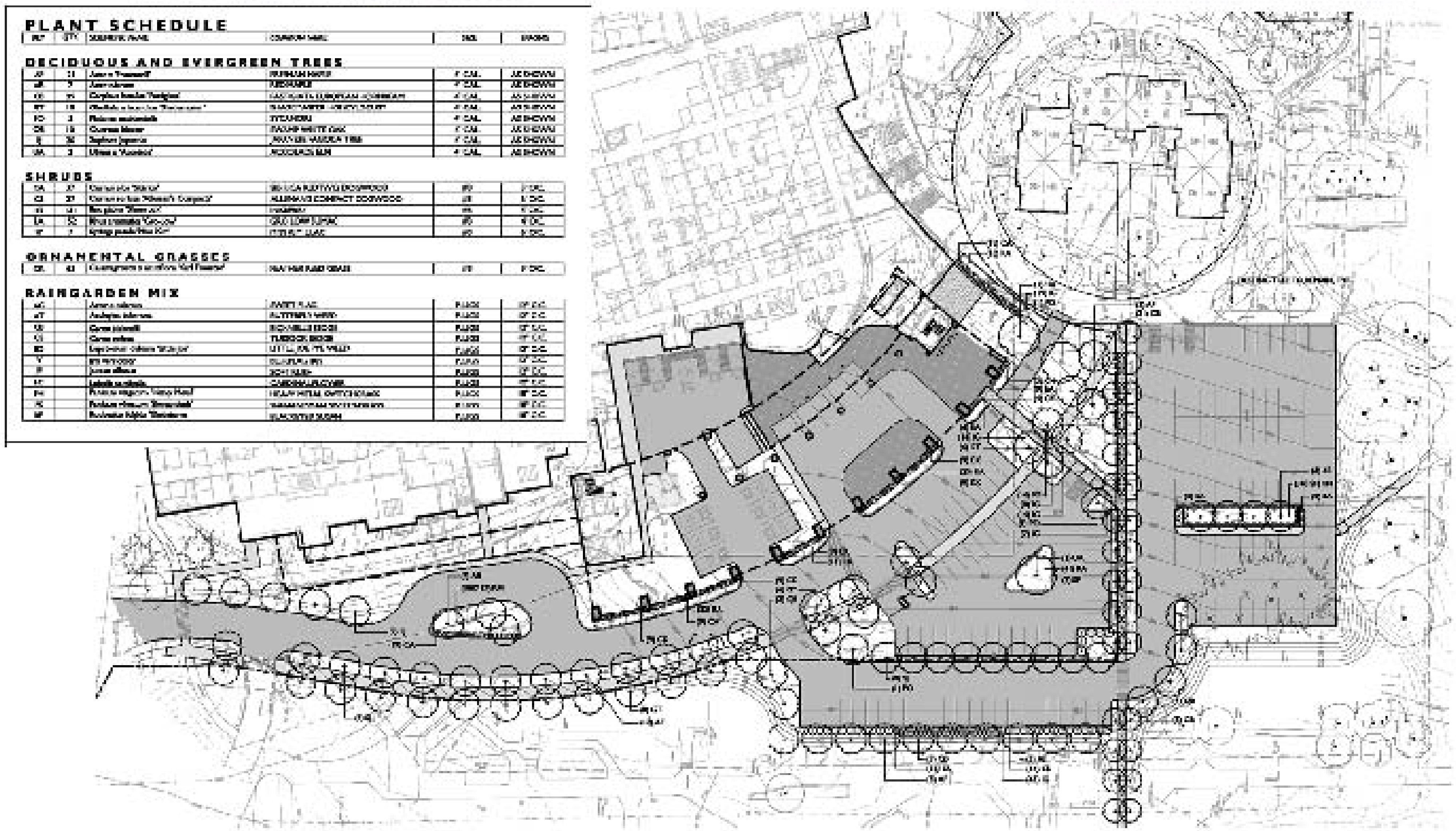
Drawing Title
OVERALL CAMPUS WATERSHED PLAN

Drawing No.
WS-1

Locale\UVM\DWGS\XL-UVM-Estila.dwg

Landscape Plan

Fletcher Allen HEALTH CARE



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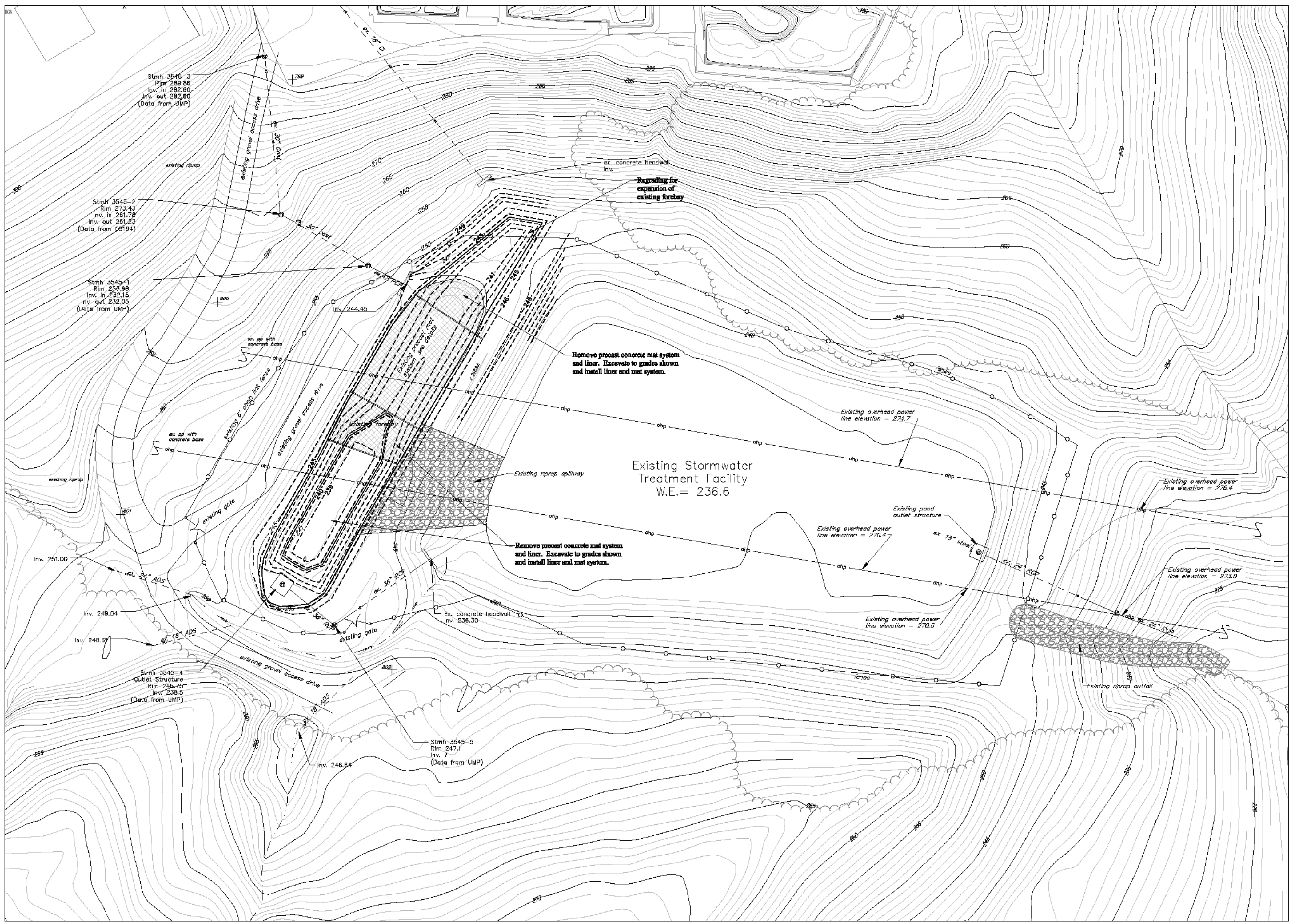
FletcherAllen.org



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Seals

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Consultant

DD Approval Signature	Date

Project North

Key Plan N.T.S.

Revision	Date	No

Fletcher Allen
HEALTH CARE
In alliance with The University of Vermont

INPATIENT BUILDING

MorrisSwitzer Project Number	201254
Date	14 AUGUST 2014
Scale	1" = 20'

Sheet Title and Number

PROPOSED SITE PLAN

CS-100

Stormwater Discharge
Fletcher Allen Inpatient Building Project
August 18, 2014

Proposed Stormwater Treatment

The project is located in the University of Vermont designated North Campus Watershed. Stormwater in the watershed is collected and piped to the North Campus Stormwater Treatment Facility located behind Centennial Field. Stormwater is detained and treated in the facility prior to discharging to the Centennial Brook Watershed which is impaired for stormwater as classified by the State of Vermont.

The Water Quality Treatment Standard, Channel Protection Treatment Standard, and Overbank Flood Protection Standard for the project will be obtained through the North Campus Treatment Facility. The following is a brief summary of the measures taken to comply with the Stormwater Treatment Standards outlined in the Vermont Stormwater Management Manual. The calculations have been provided as supporting material.

Water Quality Treatment Standard:

The North Campus Stormwater Facility is considered a P-1 Micropool Extended Detention Pond. The Water Quality Treatment Standard has been met by providing extended detention, using the modified curve number, for the 0.9" Water Quality storm. The Water Quality Volume has been provided, not just for this project, but for all portions of Fletcher Allen and the University of Vermont that are included in the North Campus Watershed. The forebay is at least 4 feet deep and will be expanded with the project to contain more than the minimum required 10% Water Quality Volume (See attached Forebay Expansion Plan). The micropool is 8 feet deep and has both an aquatic and safety bench around the perimeter. The appropriate calculations have been provided in the Water Quality Volume Appendix.

Groundwater Recharge Treatment Standard:

Because all the soils on the site are classified as hydrologic soil group D, the Groundwater Recharge Treatment Standard is waived for this site.

Channel Protection Treatment Standard (Cpv):

A Reg-U-Flo Vortex Valve is currently used to control both the Water Quality and Channel Protection storms. This structure has proven to be an effective and relatively maintenance free outlet device. The vortex valve control device was designed to provide the required cold water 12 hour centroid to centroid detention for the 1-year 24 hour storm event. The calculations for this standard have been provided in the Channel Protection Volume Appendix.

Overbank Flood Protection Treatment Standard (Qp10):

A pre-development hydrologic model was created to ensure runoff from the post-development 10 year, 24 hour storm event does not exceed the existing pre-development flows for the same storm event. The pre-development model was created considering the site under natural conditions. All pervious surfaces were modeled as a wood-grass combination. The pond outlet structure has been designed to control the post-development runoff from the 10 year, 24 hour storm to a level less than that of the pre-development 10 year, 24 hour storm. The calculations have been provided in the Overbank Flood Protection Appendix.

Pre-development 10 year, 24 hour storm = 59.32 c.f.s.
Post-development 10 year, 24 hour storm = 49.95 c.f.s.

Extreme Flood Protection Standard:

The Extreme Flood Protection Standard is waived because the total impervious area proposed for the development is less than 10 acres. The waiver for this standard is included in the Extreme Flood Protection Appendix.

Sediment Offset

Because the project is located in an impaired water way, the sediment release from the project cannot exceed the current sediment release from the existing conditions. We have calculated the sediment release from the project as 400 lbs/year. We have calculated the existing sediment release as 277 lbs/year which means the project is required to provide a 123 lbs/year sediment offset. The project will contribute to the large stormwater infiltration sediment offset for Jaycee Park.

	FAHC	UVM
REDEVELOPMENT IMPERVIOUS	49, 580 sf	25, 886 sf
NEW IMPERVIOUS	30,804 sf	10,852 sf
RESTORE (IMPERV TO PERV.)	13,143 sf	2,081 sf
EX. IMPERVIOUS TO REMAIN	642 sf	0 sf
EX. PERVIOUS TO REMAIN	12,094 sf	3,501 sf

TOTAL PROJECT AREA = 148,583 sf

Date revised	Description	Checked	Date

Design: FA
Drawn: FA
Checked:
Scale: 1" = 30'
Date: July 24, 2014
Project: 14117

OVERALL AREA WORK SHEET 7/24/2014

Fletcher Allen
In-Patient Bed Project
Colchester Avenue — Burlington, Vermont

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

Fletcher Allen
Sediment Load Analysis
Inpatient Building Project

Date: 08/17/2014

Post Development Conditions Draining to Centennial Brook

Watershed Name	Area (acres)	Impervious Area (acres)	Percent Impervious area	RV*	C factor	Pre-Treatment Load (lbs/year)**	Percent Efficiency (pre)	Final Load (lbs/year)***
GRASS	1.57	0.00	0	0.05	75	40	80	8
Paved Road	1.71	1.71	100	0.95	172	1881	80	376
Sidewalks	0.20	0.2	100	0.95	27	35	80	7
ROOFS	0.78	0.78	100	0.95	9	45	80	9
Totals:	**4.26** (acres)	**2.69** (acres)				**2,000** (lbs/year)		**400** (lbs/year)

* RV= .05+.009*(Percent Impervious Area)
** Pre-Treatment Load= [(P)(Pj)(Rv)/12](C)(A)(2.72)
*** Final Load= Pre-Treatment Load *removal efficiency

where:
Load = lbs/year
P = 33 inches in annual precipitation
Pj = .9 correction factor based on 10% of storms not producing any runoff
RV = runoff coefficient (dependent on level of imperviousness)
C = flow weighted mean concentration for pollutants (in mg/l except for bacteria in #100ml)
A = contributing area (in acres)
2.72 = conversion factor

14167:\Stormwater\POST-Sediment-Inpatient Building 8-17-14.XLS

EXISTING AREAS WORKSHEET 7-30-14

	FA	UVM
TOTAL AREA (185,534 sf.)	106,356 sf	79,177 sf
EX. ROADWAYS	52,247 sf	14,218 sf
EX. ROOFS	2,525 sf	17,562 sf
EX. SIDEWALKS	9,048 sf	15,577 sf
GRASS	42,536 sf	31,820 sf

*** Based on proposed boundary line adjustment areas.**

0' 40' 80' 160' 240'

Bar Scale 1" = 40'

Date revised	Description	Checked	Date
Design FA	Existing Sediment Offset UVM/FA		
Drawn FA			
Checked			
Scale 1" = 40'	Fletcher Allen In-Patient Bed Project		
Date July 30, 2014	Colchester Avenue Burlington, Vermont		
Project 14117	KREBS & LANSING Consulting Engineers, Inc. 164 Main Street, Colchester, Vermont 05446	11-18-site	SO-X1

Fletcher Allen
Sediment Load Analysis
Inpatient Building Project

PRE Development Conditions Draining to Centennial Brook - Fletcher Allen Only

Date: 08/17/2014

Watershed Name	Area (acres)	Impervious Area (acres)	Percent Impervious area	RV*	C factor	Pre-Treatment Load (lbs/year)**	Percent Efficiency (pre)	Final Load (lbs/year)***
GRASS	0.98	0.00	0	0.05	75	25	80	5
Paved Road	1.20	1.20	100	0.95	172	1320	80	264
Sidewalks	0.21	0.21	100	0.95	27	36	80	7
ROOFS	0.06	0.06	100	0.95	9	3	80	1
Totals:	**2.44** (acres)	**1.47** (acres)				**1,384** (lbs/year)		**277** (lbs/year)

* RV= .05+.009*(Percent Impervious Area)
** Pre-Treatment Load= [(P)(Pj)(Rv)/12](C)(A)(2.72)
*** Final Load= Pre-Treatment Load *removal efficiency

where:
Load = lbs/year
P = 33 inches in annual precipitation
Pj = .9 correction factor based on 10% of storms not producing any runoff
RV = runoff coefficient (dependent on level of imperviousness)
C = flow weighted mean concentration for pollutants (in mg/l except for bacteria in #100ml)
A = contributing area (in acres)
2.72 = conversion factor

Sediment Offset Required = 400 lbs./year from project - 277 lbs./year existing = **123 lbs./year**

14167:\Stormwater\sediment\PRE-Sediment-Inpatient Building FA 8-17-14.XLS

Centennial Brook, VT **May 15-17, 2013 Retrofit Summary Sheet**

ID#: Retrofit 15

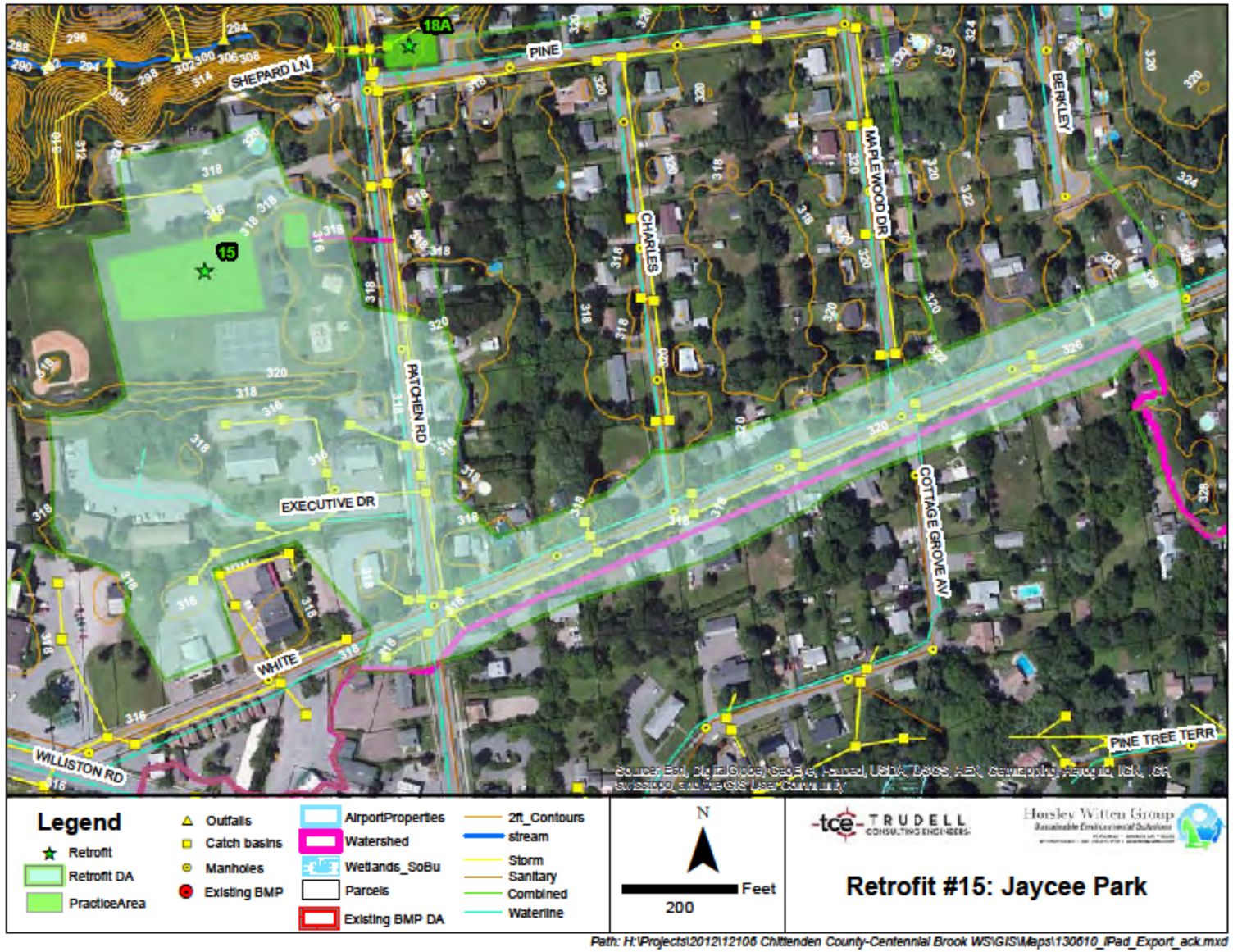
Name: Jaycee Park

Concept Description:
Pretreatment tank to underground infiltration chambers. Pretreatment could be proprietary device (e.g, StormCeptor or equal) before underground chambers. Access would need to be coordinated with playing fields. Flow diversion structure would be in Patchen Road, with depth to drain pipe at approx 6.5 feet.

Notes/Feasibility:
Flow diversion from Patchen Road drives depth of inflow approx 10.5 feet below grade (bottom of chambers 12-13 feet). Existing trees in park, reconstruction of fields
Soils at design depth, unknown.

GENERAL SITE INFORMATION	RETROFIT DETAILS
Site Contact Info: South Burlington Parks and Rec.	Project Candidate: Yes.
Ownership: Public	Retrofit of new or existing BMP: New BMP
Land Use 1: Park	Proposed Retrofit Practice 1: Underground infiltration
Land Use 2: -None Selected-	Proposed Retrofit Practice 2: Pretreatment structure
Existing BMP on site? No	Non-Structural Controls: -None Selected-
Is site a hotspot? No	Non-Structural Other: -None Selected-
Sources/pollutants 1: Sediment	Maintenance Burden: Medium
Sources/pollutants 2: -None Selected-	Benefits: Storage: YES; Water Quality: YES; Recharge: YES; Demo: NO; Repair: NO; Reuse: NO; Other: -None Selected- / Conflicts: Soils: NO; Access: NO; Land Use: YES; Utilities: YES; Polluted: NO; High WT: NO; Wetlands: NO; Other: -None Selected-
Soils: Good Infiltration	
Use in Retrofit DA: streets, SF res, some commercial	
SIZING INFO	
Drainage Area (ac): 15.74	
Impervious Area (ac): 5.81	
Practice Area Available (ft^2): 32,220 + 2,530 (pretreatment area)	
Existing Head Available? Yes (12- 13 ft depth, overflow ok)	

Date Assessed: May 17, 2013, 10:42 AM **Assessed by:** RAC, SMM



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