

TURNER  
GROUP

THE H. L. TURNER GROUP Inc.

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27 LOCKE ROAD, CONCORD, NH 03301-5417 TELEPHONE: 603-228-1122 FAX: 603-228-1126

November 1, 2011

Mr. David Stack  
Town Manager  
Town of Bow  
10 Grandview Drive  
Bow, NH 03304

SUBJECT: Final Report  
Update of Town Center  
Town of Bow  
Bow, New Hampshire

Dear Mr. Stack:

Attached is the final report for the Update of the Town Center for Bow, New Hampshire.

We would like to thank the Town for retaining our firm to provide these services for this very important project. We would especially like to thank the representatives for the departments (police, fire, emergency management, public works), the Town managers, as well as the Town Center and Public Safety Facility Study Committee for making themselves available to us on this portion of the project.

We trust that you will find the information in this report useful and that it will serve the Town for a basis for the new Town Center. If you should have any questions, please do not hesitate to contact me at (603) 228-1122, ext. 133.

Sincerely,

THE H.L. TURNER GROUP INC.



William D. Hickey ~ Principal  
Vice President of A&E Services

WDH/sai

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ARCHITECTS • ENGINEERS • BUILDING SCIENTISTS



## TOWN CENTER UPGRADE REPORT

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## TOWN CENTER UPGRADE REPORT

### I. PROJECT OVERVIEW

According to the original RFP dated July 11, 2011, the objectives for the project were as follows:

#### Overview

*The objectives and goals of the study are to address the information needs identified by the Town Center and Public Safety Facility Study Committee (TC & PSFSC) to include the following:*

- *Update the Town Center Concept Design.*
- *Perform an assessment of health and environmental conditions of existing buildings to include the Community Building/Fire Department Building (2 Knox Road, Block 3, Lot 147) and Police Department Building (12 Robinson Road, Block 2, Lot 109). The assessment is to include identification of all natural air and health quality concerns, i.e. mold, mildew, etc., as well as to identify the presence of natural or manmade hazardous materials; all of which may preclude continued use of these structures, require future investment to protect the health and welfare of the employees and the public, or affect the cost of demolition.*
- *Conduct a geotechnical site analysis on a 17 acre Town owned parcel (1 Knox Road, Block 5, Lot 68) located adjacent to the existing Community Building/Fire Department Building in the Town Center based on the updated Concept Design to determine soil conditions and environmental aspects to be used in the preliminary design of buildings and structures. The analysis shall include a minimum of six (6) borings drilled to a depth of thirty feet (30') or to bedrock, whichever is shallower in depth. Information to be collected is to include at a minimum, soils encountered, blow counts to determine the compressive strength of native materials, depth to groundwater, presence of contaminants (based on field screening and observations) and other information required to properly assess the conditions expected to be encountered. The data shall be presented on a boring log and include a brief description of the findings of each boring.*
- *On the basis of the recommendations developed by the TC & PSFSC in December 2010, with additional input from the TC & PSFSC, prepare cost estimates (capital and operating) for the three existing scenarios:*
  - *No new facilities in the next five years.*
  - *Construct a new fire station within the next five years and upgrade police.*
  - *Recreation facilities as necessary to provide safe conditions for ten more years.*



## TOWN CENTER UPGRADE REPORT

- *Construct a new fire and police building within the next five years and upgrade.*
- *Recreation facilities to provide safe conditions for ten more years.*
- *Analyze what to do with the existing buildings (i.e. sell, renovate, demolish, etc.), describe recommended modifications and/or renovations to the existing buildings, and develop concepts (or modify existing concepts) for new facilities to the extent necessary to support the cost estimates required above.*
- *Preparation of a report which summarizes the findings of the study and assessment and provides comparative descriptive and financial recommendations for each concept. The successful proposer will be required to attend a Committee meeting to present and review the draft report with the Committee before it is finalized and attendance at a meeting to present the final report.*

The H.L. Turner Group Inc. (TTG) received authorization to proceed on August 11, 2011 and has been working with the Town departments (police, fire, emergency management, public works) the Town managers, as well as the Town Center and Public Safety Facility Study Committee (committee).

### **RECOMMENDATIONS**

As a result of this study, we recommend that the Town Center update occur in three phases.

#### **PHASE 1**

Phase 1 would be the construction of a combined public safety building on the lot at 1 Knox Road.

#### **PHASE 2**

Phase 2 would be the construction of the entry to the new Town Center area on 1 Knox Road and the construction of the first building in the Town Center, a new recreation building. Phase 2 would also include the demolition of the existing community building and the creation of a Town park where the community building currently is sited.

#### **PHASE 3**

Phase 3 of the project would be the completion of the road started in Phase 2 and the construction of other buildings that would create a Town Center. The information regarding the development of the designs is what makes up the body of this report.



## TOWN CENTER UPGRADE REPORT

### II. GEOTECHNICAL SITE ANALYSIS

As requested, TTG contracted with Geotechnical Services, Inc. (GSI) to complete the geotechnical site analysis. Based on the preferred site configuration of the safety building closer to the intersection and the recreation building on the back section of the property, GSI was given a boring layout. Four (4) borings were proposed in the front of the property in the footprint of the proposed safety building and two (2) borings were proposed in the location of the future recreation building. The boring layout is shown on Figure No. 2 in the GSI report.

As outlined in the GSI report, the soils identified are mainly glacial till with refusal for most borings at approximately ten feet below grade. The geotechnical engineer believes boulders caused the refusal.

The geotechnical report recommends a fairly high bearing capacity for the design of the foundation which is an indication of good soils.

Overall, the geotechnical report is encouraging and we do not foresee any issues based on the investigation that was done to construct the safety building with a full basement under the office area as recommended based on our design.

The complete report from GSI is attached.

**GEOTECHNICAL INVESTIGATION REPORT  
BOW TOWN CENTER DEVELOPMENT  
1 KNOX ROAD  
BOW, NEW HAMPSHIRE**

October 11, 2011

**GSI Project No. 211280**

*Prepared for:*

Mr. William Hickey  
The H.L. Turner Group  
27 Locke Road  
Concord, New Hampshire 03301

*Prepared by:*

Geotechnical Services, Inc.  
18 Cote Avenue  
Goffstown, New Hampshire 03045

©Geotechnical Services, Inc.





**GEOTECHNICAL SERVICES INC.**

Geotechnical Engineering Environmental Studies Materials Testing Construction Monitoring

October 11, 2011

Mr. William Hickey  
The H.L. Turner Group, Inc.  
27 Locke Road  
Concord, New Hampshire 03301

**RE: Geotechnical Investigation Report  
Bow Town Center Development  
1 Knox Road  
Bow, New Hampshire  
GSI Project No. 211280**

Dear Mr. Hickey,

This report presents the results of a geotechnical investigation completed by Geotechnical Services, Inc. (GSI) for the proposed Bow Town Center Development located in Bow, NH. The site is situated on a slight incline on a grassy field and partially wooded area at 1 Knox Road in Bow, NH. Included are the findings of a subsurface exploration performed by GSI as well as an engineering evaluation of the subsurface conditions encountered.

The site subsurface conditions include topsoil overlaying a sandy subsoil on top of a glacial till deposit. A spread footing foundation with slab-on-grade is satisfactory anticipating that the footings will bear upon the natural glacial till. The topsoil and subsoil should be removed from beneath the entire building footprint prior to foundation construction. The accompanying geotechnical report provides our foundation design recommendations and earthwork construction considerations for the proposed site development.

We appreciate the opportunity to perform this investigation and look forward to working with you on the design and construction phases of this project. If you have any questions as to the contents of this report, please do not hesitate to contact us.

Very truly yours,

**GEOTECHNICAL SERVICES, INC.**

Harry K. Wetherbee, P.E.  
*Principal Engineer*

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Table 1: Gradation Specifications

Figure 1: Site Location Plan

Figure 2: Surface Exploration Location Plan

Appendix A: Limitations

Appendix B: Test Boring Logs

Appendix C: Recommended Program for Structural Tests and Inspection and Foundations

## 1.0 INTRODUCTION

### 1.1 Purpose and Scope

This report presents the results of a geotechnical investigation completed by Geotechnical Services, Inc. (GSI) for the Bow Town Center Complex located along Knox Road in Bow, NH. Included are the findings of our subsurface exploration program and an engineering evaluation of the subsurface conditions encountered. The evaluation concerns itself with foundation design and earthwork construction for the new building. The contents of this report are subject to the **Limitations** included in Appendix A.

The scope of the services performed by GSI to meet the above stated objectives for geotechnical engineering services included the following:

1. Review of the proposed Town Center Development Plan provided by the H.L. Turner Group.
2. Coordination and observation of seven (7) test borings by a representative from our office.
3. Preparation of recommendations for spread footing foundation and slab-on-grade support of the proposed structure, including bearing capacities and settlement estimates.
4. Preparation of general recommendations based on the subsurface conditions encountered.
5. Development of seismic design recommendations based on the subsurface conditions encountered.
6. Formulation of lateral earth pressure design criteria.
7. Preparation of foundation waterproofing and damp proofing recommendations.
8. Preparation of this geotechnical engineering report which summarizes our findings and recommendations.

Services with respect to preparation of plans and specifications referenced above, construction phase quality control, attendance at meetings and any other services not specifically outlined herein are not included in our current scope of services.

### 1.2 Site Description

The project site lies on the corner of Knox Road and Logging Hill Road on a large, open field of cut grass bordered on two (2) sides by woodland. The terrain rolls upwards from Logging Hill Road and crests in the area of the proposed complex. The proposed building complex is located uphill from Logging Hill Road and the planned public safety building in a partially wooded area with trails running through the site. Several boulders and large rocks are visible on the surface or embedded in the soil, only partially visible. Access to the site is available from both Knox and Logging Hill Road.



## 2.0 SUBSURFACE EXPLORATION PROGRAM

### 2.1 Subsurface Explorations

The subsurface exploration program included the advancement of seven test borings. The seven test borings, identified as B-1 to B-7 were completed to determine the type and relative density of the subsurface soils and to provide samples. The 7 test borings were completed October 5, 2011 by Expedition Drilling using a CME53 ATV drill rig under the direction of GSI. Soil borings were advanced utilizing 2 $\frac{3}{4}$  inch diameter Auger and split-spoon sampler. Standard Penetration Tests (SPTs) were performed at the sampling intervals in general accordance with ASTM D1586.

The soils encountered during the exploration program were classified in the field by a field engineer from GSI. The soil classification procedure used is in general accordance with the Burmister system. Field descriptions and penetration resistance of the soils encountered, observed depth to groundwater, and other pertinent data are contained in the test boring logs included in Appendix B.

The exploration locations were determined in the field by pre-determined building dimensions and are considered accurate to the degree implied by the survey method used. The location of each exploration is illustrated on Figure 2 of this report.

## 3.0 SUBSURFACE CONDITIONS

The subsurface explorations encountered two general stratigraphic soil units at the site. These included a surficial topsoil and subsoil underlain by a glacial till soil unit with shallow refusals.

### 3.1 Surficial Soils

The surface soils consisted mostly of black, dry to moist topsoil and light brown subsoil to depths averaging around 5 to 7 feet below the ground surface. The subsoil consisted primarily of sand with small amounts of gravel and silt. The unit was found to be dense where drilled and sampled and not sensitive to pressure by rubber tired equipment.

### 3.2 Glacial Till

The predominant subsurface strata consist of a glacial till deposit. Glacial till is a non-sorted, non-stratified natural deposit of sand, silt, gravel, and boulders mixed in various proportions and deposited directly by the glaciers in a non-aqueous depositional environment. The material is composed of coarse to fine SAND with varying amounts of silt and gravel. It was found to be typically dense to about 10 feet in depth and increased rapidly in density at approximately 20 feet. SPT values ranged from 20 to 100+ blows per foot.



### 3.3 Refusal

Auger and/or split spoon refusal conditions were encountered in most of the test borings drilled on the site at depths ranging from 9 to 19 feet. The borings encountered refusal at depths around 10 feet, only B-3 was able to continue beyond that boundary. Auger refusal is defined as the inability of the hollow stem augers to advance despite increasing torque and downward pressure applied by the drill rig. Auger refusal may be caused by nested cobbles, very dense soils, boulders, obstructions, or bedrock. Split spoon refusal is defined as either 100 blows or more required to drive the split spoon sampler 12 inches with a 140 lb hammer falling 30 inches; 50 blows for less than 3 inches of advancement; or 10 blows with no discernible, vertical movement of the split spoon sampler. Based on reconnaissance performed during the subsurface exploration program and the observations of the borings, it is GSI's opinion that the refusals were a combination of obstructions at shallow depths and very dense glacial till at deeper depths.

### 3.4 Groundwater

Groundwater conditions were not determined during Auger advancement, a small pond within view of the site suggests the water level at the time of drilling was lower than would be encountered from the construction of the proposed complex. The low-permeability, cohesive rich glacial till underlying the site is expected to act as an impermeable layer subsequently directing future surface drainage along its preferred exposed-as-excavated contour pathway.

Groundwater conditions were not observed during boring advancement, while sampling and immediately upon completion and should be anticipated to vary in response to equilibration time, rainfall, snowmelt, seasonal fluctuations, site development and other factors not present during the time that the explorations were performed.

## 4.0 FOUNDATION DESIGN RECOMMENDATIONS

### 4.1 Spread Footing and Concrete Floor Slab Bearing Requirements

The subsurface conditions are suitable for supporting the proposed building upon spread footings deriving bearing support atop the competent glacial till. The topsoil and any soil disturbed during excavation should be removed from beneath the building footprint and from within the perimeter footings zone of influence. The footing zone of influence is that area which is encompassed by a 1H:1V splay originating 1 foot from the edge of the footing and sloping down and outward.

### 4.2 Bearing Capacity and Settlement Evaluation

Spread footings may bear upon the undisturbed glacial till deposit provided the subgrade is prepared as outlined in this report. Based on the predominant overburden being a cohesionless, dense to very dense glacial till deposit, GSI performed a footing bearing capacity analysis utilizing values from an interpretation of the SPT values. The bearing capacity analysis incorporates parametric factors developed by Terzaghi, Meyerhof, and Brinch-Hansen.

Based on the results of the bearing capacity analysis, GSI recommends that footings be proportioned for an allowable net soil bearing capacity of 2.5 tons per square foot (tsf).

The foregoing allowable bearing pressure for soil is influenced by footing geometry and embedment depth. With regard to footing geometry, the minimum footing width of column and strip footings should be 4 ft and 2 ft respectively. The minimum soil embedment depth for bearing support is 24 inches.

#### **4.3 Frost Protection**

In accordance with IBC 2009, exterior footings should be protected from frost at a minimum depth for the locality in which the structure is located. Based on local code and building practice, the exterior footing should be protected with at least 4 feet of earthen embedment. Interior footings should be placed at least 18 inches below finished floor grade provided the interior area is to be heated; otherwise a minimum 4 feet of earthen cover is required. If foundation construction is to occur during the cold weather, the foundation elements should be protected against frost.

#### **4.4 Seismic Design Parameters**

The seismic design parameters have been reviewed in accordance with the 2009 Edition of the International Building Code, with respect to structural design and site classification parameters. Upon review of the subsurface soils data, the site is to be associated with Site Class “C”. The subsurface and groundwater conditions have been analyzed and are not deemed susceptible to earthquake induced “liquefaction”.

#### **4.5 Concrete Slab-on-Grade Recommendations**

A concrete slab-on-grade is proposed for the basement of the building. Our recommendations are based on the provisions for floor slab design outlined in ACI 302.1. These recommendations incorporate the subsurface conditions with proposed materials for determination of the modulus of subgrade reaction ( $K_s$ ). It is GSI’s recommendation that a minimum 6 inch layer of Slab Base Course Soil be placed directly atop the properly prepared subgrade.

The proposed slab base course would provide uniform support for the slab and provide improved drainage of water from beneath the slab. The base course soil should be compacted to at least 95 percent relative compaction. A modulus of subgrade reaction ( $K_s$ ) of 200 pci may be used for design.

#### **4.6 Foundation Waterproofing Recommendations**

Our foundation waterproofing recommendations are formulated based on the subsurface conditions encountered, the proposed finish floor elevations, and the criteria set forth in Article 1805.4, “SUBSOIL DRAINAGE SYSTEM” of IBC 2009. Based on our review, GSI recommends a perimeter foundation ring be located at the bottom of footing elevation and six inches outward from the edge of the footing. Furthermore, GSI recommends that floor slab under drainage be installed beneath the basement slab-on-grade.



Based on our analysis, GSI recommends the under slab drainage be spaced 20 feet on-center. All subdrains should consist of 6 inch diameter, schedule 40, perforated PVC drain pipe encased within 6 inches of a blended 3/8 inch to 3/4 inch size crushed stone and wrapped with a filter fabric such as Mirafi 140N or equal.

The subdrain system should discharge via gravity flow into the nearest catch basin, manhole, or discharge point for stormwater. It is recommended that a screen be installed at the outlet of the sub drain to impede rodents. In addition, a backflow preventer valve should be installed in the system to prevent surcharge in the event of a flood which rises above the under drainage system. Furthermore, GSI recommends clean-outs are installed with a maximum spacing of 100 feet.

In addition, the ground surface immediately adjacent to the foundation should be sloped away from the building to allow for positive drainage. It is recommended that the surficial materials adjacent to the building be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface. Such impermeable materials may include Portland cement concrete, bituminous concrete or vegetated silty topsoil.

#### 4.7 Foundation Damp Proofing Recommendations

GSI recommends that a subslab vapor retarder be placed beneath the proposed slab-on-grade. The recommended retarder should be a minimum; 8 mil polyethylene with joints lapped a minimum of 12 inches. As recommended in ACI 360R-92, *Design of Slabs on Grade*, paragraph 9.8, the vapor retarder should not be placed in direct contact with the slab-on-grade. The retarder should be placed atop a properly prepared subgrade beneath the floor slab base course material. This will allow excess bleed water to pass out the bottom of the slab, allowing faster finishing and prevent slab curling.

Damp proofing, waterproofing, and subsurface drainage will not prevent the lower level dampness which results from the condensation of humid air on cool surfaces. Condensation within the lower level may be reduced by keeping the vapor pressure in the basement low (dry air) and the surfaces warm. Expanded, extruded polystyrene insulation or foamed glass insulation under the slab on grade or outside the foundation walls help keep the interior surfaces warm. In addition, the potential exists to design the mechanical system, such that the lower level is kept warm in the winter, dry in the summer, or connecting dehumidifiers to the system to keep the vapor pressure low.

### 5.0 PAVEMENT DESIGN RECOMMENDATIONS

Based on experience with projects of similar size, scope, and subsurface conditions, GSI recommends that the following pavement section be utilized.

#### RECOMMENDED PAVEMENT SECTION

<i>Pavement Layer</i>	<i>Thickness (inches)</i>
Bituminous Concrete Top Coarse	1.0
Bituminous Concrete Binder Coarse	2.0
Crushed Gravel Base Coarse (NHDOT 304.3)	6.0
Gravel Borrow Sub-base Coarse (NHDOT 304.2)	12.0



Pavement subgrades should be proof rolled in order to densify the subgrades using a minimum of 4 passes with a 10 ton vibratory drum compactor.

## 6.0 EARTHWORK RECOMMENDATIONS

### 6.1 Foundation Subgrade Preparation

Prior to foundation construction, all topsoil and any other unsuitable materials encountered should be removed from within the footing zone of influence. Footings should bear directly upon a competent subgrade as described above and visually observed by GSI. In order to provide a stable platform for structural fill placement or footing construction, the final 12 inches of excavation should ideally be performed with smooth bladed equipment in order to provide the desired neat, undisturbed excavation bottom.

Foundation and floor slab subgrades should be proof compacted using a heavy vibratory plate or drum roller as described below, prior to foundation construction or placing additional fill in order to densify disturbed soils resulting from excavation and preload the subgrade.

Recommended proof compaction should include 8 coverages (4 in each orthogonal direction) with a minimum of a 10 ton vibratory roller. During the proof rolling process, the subgrade should be observed by a qualified Geotechnical Engineer to identify areas exhibiting weaving or excessive reaction. Any soils exhibiting excessive reaction should be locally excavated and replaced with free draining structural fill or crushed stone.

Structural fill, if required, should be placed in maximum loose lifts of 8 inches and be compacted to 95 percent of maximum dry density as determined by the modified proctor test (ASTM D1557). The loose lift thickness may be increased to 12 inches if a minimum 10 ton vibratory roller is used for soil compaction. The adequacy of the compaction efforts should be verified by field density testing. Based on the observation of the retrieved soil samples from the test borings, it appears that the existing fill soils are generally unsuitable for reuse as structural fill, but may be reused ordinary fill.

### 6.2 Protection of Foundation Subgrades

The contractor is required to maintain stable dewatered subgrades for foundations, pavement areas, and utility trenches. Subgrade disturbance may be influenced by excavation methods, moisture, precipitation, groundwater control, and construction activities. If construction activities are to take place during winter months, the contractor shall protect the work area from freezing, which may necessitate the use of soil blankets or tents and heaters to protect the subgrade surface and fill soils.

### 6.3 Construction Dewatering

Although the test borings indicated groundwater might not be an issue during construction, groundwater may be encountered during excavation for the foundations and associated underground utilities for the proposed structure. The contractor should be prepared in the event groundwater impacts are felt via seasonal fluctuations or runoff. Stormwater runoff developed from storm events should be diverted away from excavation areas to minimize any impoundment in the excavation or disturbance to the foundation subgrades.



It is anticipated that groundwater and storm water may be controlled by localized dewatering efforts employing sumps and pumps. Groundwater water should be maintained at least 12 inches below the foundation grade until backfilling is complete. A lift of crushed stone or free draining structural fill at foundation grade may be utilized to facilitate dewatering and provide a dry and stable subgrade during construction.

#### **6.4 Temporary Excavations**

Deep excavations (greater than 5 ft) may be required within the proposed building area for associated utility excavations near the building footprint. It is envisioned that any locally deeper excavations may be accomplished with sloped excavations. For stable excavation designs, the on site sandy soils should be considered Type C soils in accordance with Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926). The maximum temporary slopes for Soil Type C are 1.5H:1V provided groundwater is maintained below the bottom of the excavation. The foregoing slope requirement does not consider surcharge loads (stockpiled soils, equipment, materials) that may be situated at the crest of the slope and vibration loads (blasting, soil compaction). It should be noted that these slope requirements are minimums required by OSHA regulations. The contractor is ultimately responsible for stability of temporary slopes associated with construction activities.

#### **6.5 Construction Monitoring**

It is recommended that GSI be retained to observe foundation construction, subgrade preparation, backfilling, and compaction in conformance with the requirements of local building codes. GSI has the geotechnical personnel trained and experienced in monitoring earthwork excavation and testing, as well as a full service Soils and Materials laboratory. As a guide, we have enclosed a *Recommended Program for Structural Tests and Inspections for Soils and Foundations*, attached as Appendix C of this report.

# **GEOTECHNICAL SERVICES, INC.**

**BOW TOWN CENTER COMPLEX  
1 KNOX ROAD  
BOW, NEW HAMPSHIRE  
GSI PROJECT NO. 211280**

## **RECOMMENDED SOIL GRADATION SPECIFICATIONS**

**TABLE 1**

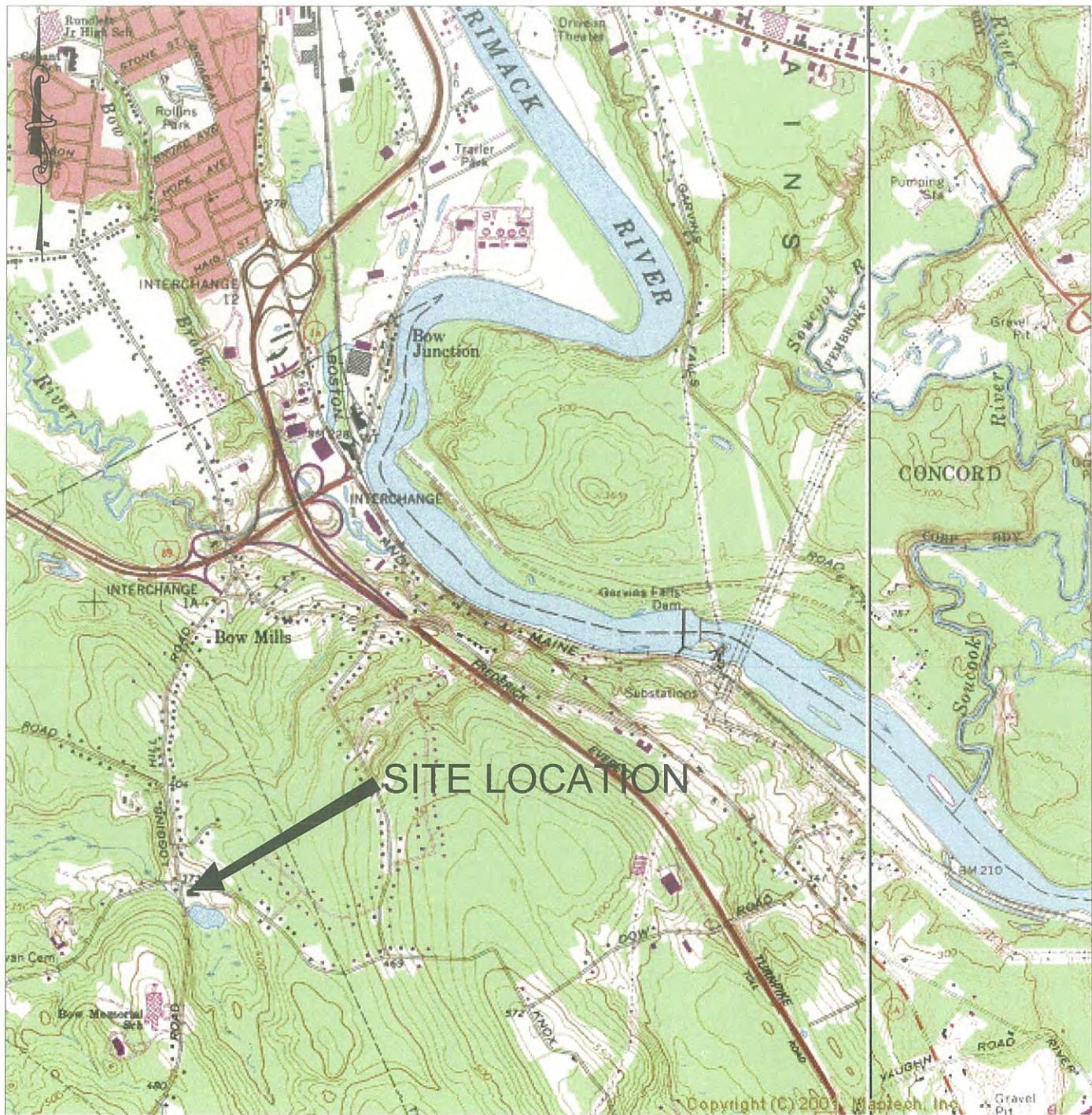
Sieve Size		<b>PERCENTAGE PASSING BY WEIGHT</b>		
	Soil Type	Crushed Gravel Base Course	Slab Base Soil	Structural Fill
6"				100
2"		100	100	---
1"		---	---	---
3/8"		30-65 <sup>1</sup>	60-100	---
#4 <sup>2</sup>		25-55	50-85	40-70
#10		15-40	40-70	---
#40		8-20	25-45	
#200		2-8	10 max	0-15

### **NOTES:**

Ordinary fill used for landscape areas may be any soil material that is relatively free from organic matter, debris, frost, stones larger than 2/3 the maximum lift thickness, or other deleterious materials.

1. Of the material retained on the 3/8" sieve, at least 75% shall have fractured faces.
2. Aggregate retained on the No. 4 sieve shall consist of durable particles of crushed stone, gravel, or slag.





LOCUS MAP

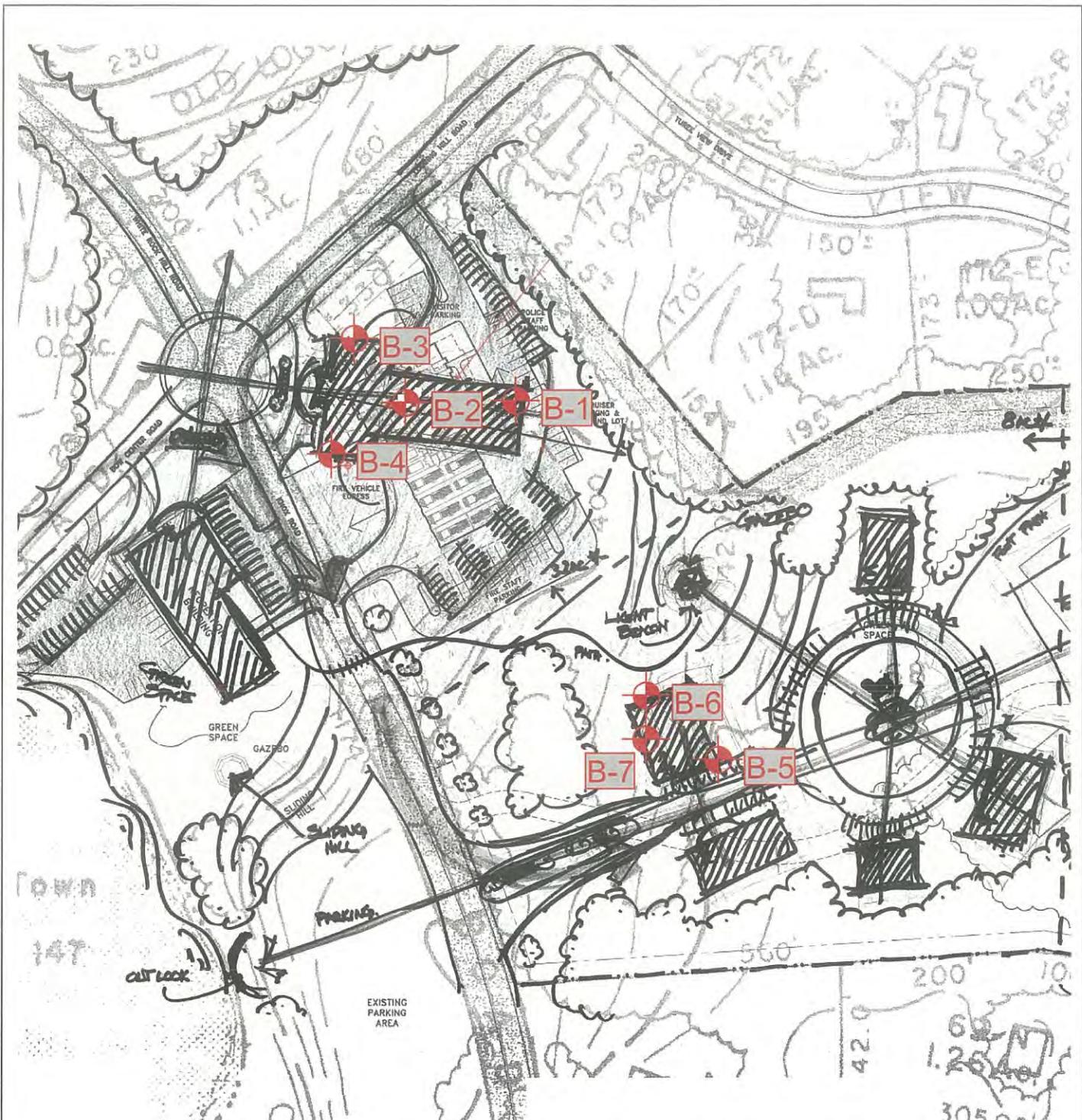
Bow Center Development  
Bow, New Hampshire



GEOTECHNICAL SERVICES INC.  
18 COTE AVENUE, UNIT #11, GOFFSTOWN, NH 03045  
TEL. (603) 624-2722 FAX. (603) 624-3733

DRAWN BY: KJM	DATE: October 2011
CHECKED BY: HKW	SCALE: 1"=2000'
FILE NAME: 211280 - Bow CD.dwg	PROJECT NO.: 211280

FIGURE  
NO. 1



 B-1 Test Boring Location (Approximate)

## TEST BORING LOCATION PLAN



**GEOTECHNICAL SERVICES INC.**  
18 COTE AVENUE, UNIT #11, GOFFSTOWN, NH 03045  
TEL. (603) 624-2722 FAX. (603) 624-3733

## Bow Center Development Bow, New Hampshire

DRAWN BY: KJM DATE: October 2011

CHECKED BY: HKW

SCALE: 1"=120'

FILE NAME:  
211280 - Bow CD.dwg

PROJECT NO.: 311380

**FIGURE  
NO. 2**

**APPENDIX A**  
**LIMITATIONS**



## LIMITATIONS

### Explorations

1. The analyses, recommendations, and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by Geotechnical Services, Inc.

### Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report

7. This report has been prepared for the exclusive use of the H.L. Turner Group in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by Geotechnical Services, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to evaluation considerations only.



**APPENDIX B**  
**TEST BORING LOGS**





## TEST BORING LOG

Boring No.

B - 1

Page 1 of 1

Project	Bow Complex		GSI Project No.		211280		Elevation		
Location	Bow, NH		Project Mgr.		Harry Wetherbee		Datum		
Client	H. L. Turner Group		Inspector		Evan White		Date Started	10/5/2011	
Contractor	Expedition Drilling		Checked By		Harry Wetherbee		Date Finished	10/5/2011	
Driller	Steve Calavette		Rig Make & Model		CME		Rig Model	CME53	
Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	Hammer Type:		
Type	HSA		SS	<input type="checkbox"/> Track	<input checked="" type="checkbox"/> ATV	<input type="checkbox"/> Safety Hammer			
Inside Diameter (in.)	2 3/4"		ST	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geoprobe	<input type="checkbox"/> Doughnut			
Hammer Weight (lb)			140	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Automatic			
Hammer Fall (in.)			30"	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Cutting Head		

Depth (ft)	Casing (Blows/ft)	Sample Data						Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec (in.)	SPT (Bl./6-in.)	Rock RQD (%)	PID Rdg. (ppm)	
0	S-1	0-2						Topsoil Brown, moist, fine to medium SAND, little Silt, little Gravel.
5	S-2	5-7	16	17 19 16 16				Light-Brown, dense, damp, fine to coarse SAND and GRAVEL, little Silt. (fractured rock in spoon)
10	S-3	10-12	15	23 40 57/4				6'10" S-2A veneer of Brown, dense Silt Light-Brown, dense, damp, fine to coarse SAND and GRAVEL. Little Silt. Refusal at 11'-4"
15	S-4	15-17						
20	S-5	20-22						

Water Level Data			Sample Identification	Cohesive Soils N-Value	Granular Soils N- Value
Depth (ft) to:			O = Open Ended	0 to 2: Very Soft	0 to 4: Very Loose
Bott. of Casing	Bott. of Hole	Water	U = Undisturbed	2 to 4: Soft	4 to 10: Loose
			S = Split Spoon	4 to 8: Medium Stiff	11 to 30: Medium Dense
			C = Rock Core	8 to 15: Stiff	31 to 50: Dense
			G = Geoprobe	15 to 30 Very Stiff	Over 50: Very Dense
				Over 30: Hard	

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

## Notes

B - 1

 Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 01832 Tel. 978.374.7744 Fax. 978.374.7799	<b>TEST BORING LOG</b>										Boring No. <b>B - 2</b> Page 1 of 1	
	Project		Bow Complex			GSI Project No.		211280		Elevation		
	Location		Bow, NH			Project Mgr.		Harry Wetherbee		Datum		
	Client		The H. L. Turner Group			Inspector		Evan White		Date Started		10/5/2011
	Contractor		Expedition Drilling			Checked By		Harry Wetherbee		Date Finished		10/5/2011
	Driller		Steve Calavette			Rig Make & Model		CME		Rig Model		CME53
	Item:		Auger	Casing	Sampler	Core Barrel		<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Track <input checked="" type="checkbox"/> ATV <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Bomb. <input type="checkbox"/> Geoprobe <input type="checkbox"/> Doughnut <input type="checkbox"/> Tripod <input type="checkbox"/> Other <input checked="" type="checkbox"/> Automatic  <input type="checkbox"/> Winch <input type="checkbox"/> Cat Head <input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head		
	Type		HSA		SS							
	Inside Diameter (in.)		2 3/4"		ST							
	Hammer Weight (lb)				140							
Hammer Fall (in.)				30"								
Depth (ft) Casing (Blows/ft)	<b>Sample Data</b>								<b>Soil-Rock Visual Classification and Description</b> (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)			
	Depth (ft)	No.	Depth (ft)	Rec (in.)	SPT (Bl./6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)				
	0	S-1	0-2						Topsoil 3"			
	5	S-2	5-7	16	9 14 17 42				Light-Brown, dense, moist, coarse to fine SAND, little Gravel, little Silt. (fractured rock in tip)			
	10	S-3	10-12						Refusal at 10'1"			
	15	S-4	15-17									
	20	S-5	20-22									
	<b>Water Level Data</b>								<b>Sample Identification</b> O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe			
	Date	Time	<b>Depth (ft) to:</b>			<b>Cohesive Soils N-Value</b> 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30: Very Stiff Over 30: Hard						
			Bott. of Casing	Bott. of Hole	Water							
			Trace (0 to 5%),	Little (10 to 20%),	Some (20 to 35%),	And (35 to 50%),						
<b>Notes:</b>											<b>B - 2</b>	

 <b>Geotechnical Services, Inc.</b> • 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 • 12 Rogers Road, Haverhill, MA 01832 Tel. 978.374.7744 Fax. 978.374.7799	<b>TEST BORING LOG</b>								<b>Boring No.</b> <b>B - 3</b> Page 1 of 1				
	Project		Bow Complex		GSI Project No.		211280				Elevation		
	Location		Bow, NH		Project Mgr.		Harry Wetherbee		Datum				
	Client		H.L. Turner Group		Inspector		Evan White		Date Started		10/5/2011		
	Contractor		Expedition Drilling		Checked By		Harry Wetherbee		Date Finished		10/5/2011		
	Driller		Steve Caravelle		Rig Make & Model		CME		Rig Model		CME53		
	Item:		Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b>				
	Type		HSA		SS		<input type="checkbox"/> Track	<input checked="" type="checkbox"/> ATV	<input type="checkbox"/> Safety Hammer				
	Inside Diameter (in.)		2 3/4"		ST		<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geoprobe	<input type="checkbox"/> Doughnut				
	Hammer Weight (lb)				140		<input type="checkbox"/> Tripod	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Automatic				
Hammer Fall (in.)				30"		<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Cutting Head				
Depth (ft)	Casing (Blows/ft)	<b>Sample Data</b>						<b>Soil-Rock Visual Classification and Description</b> (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)					
		No.	Depth (ft)	Rec (in.)	SPT (Bl./6-in.)	Rock RQD (%)	PID Rdg. (ppm)					Stratum Change (ft)	
0	S-1	0-2						Topsoil 3"					
5	S-2	5-7	18	13 13 15 21				Light-Brown, Medium Dense, moist, coarse to fine SAND and GRAVEL, trace Silt. (fractured rock in tip)					
10	S-3	10-12	21	14 24 36 72			10'2"	Light-Brown, Very Dense, moist, coarse to fine SAND, some Gravel trace Silt.					
15	S-4	15-17	10	52 50/4			15'10"	Spoon Refusal at 15'10" Brown to Grey, Very Dense, moist, coarse to fine SAND and Gravel trace Silt. (weathered rock in tip) Auger refusal at 19' Spoon refusal at 19'1"					
20	S-5	20-22											
<b>Water Level Data</b>								<b>Sample Identification</b> O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe		<b>Cohesive Soils N-Value</b> 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30: Very Stiff Over 30: Hard		<b>Granular Soils N- Value</b> 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense	
Date	Time	Depth (ft) to:											
		Bott. of Casing	Bott. of Hole	Water									
Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)								<b>B - 3</b>					
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20	S-5	20-22						Auger refusal at 14'6" Spoon refusal at 14'7" (rock in tip)					
Water Level Data								Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value	
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe		0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30: Very Stiff Over 30: Hard		0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense				
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Contractor		Expedition Drilling			Checked By		Harry Wetherbee		Date Finished			
Driller		Steve Calavette			Rig Make & Model		CME		Rig Model			
Item:		Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod		<input type="checkbox"/> Skid <input checked="" type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input type="checkbox"/> Other		Hammer Type:		
Type		HSA		SS						<input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input checked="" type="checkbox"/> Automatic		
Inside Diameter (in.)		2 3/4"		ST								
Hammer Weight (lb)				140								
Hammer Fall (in.)				30"						<input type="checkbox"/> Winch <input type="checkbox"/> Cat Head		
										<input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head		
Depth (ft)	Casing (Blows/ft)	Sample Data							<b>Soil-Rock Visual Classification and Description</b> (Soils - Burnmister System) (Rock - U.S. Corps of Engineers System)			
		No.	Depth (ft)	Rec (in.)	SPT (Bl./6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)				
0	S-1	0-2						Topsoil 5"				
5	S-2	5-7	7	16 34 21 18				Light-Brown, Very Dense, moist, medium to fine SAND and GRAVEL, some Silt.				
10	S-3	10-12						Auger refusal at 9' Spoon refusal at 9'3"				
15	S-4	15-17										
20	S-5	20-22										
Water Level Data								Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe	Cohesive Soils N-Value 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	Granular Soils N- Value 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense		
Date	Time	Depth (ft) to:										
		Bott. of Casing	Bott. of Hole	Water								
Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)								Notes:	B - 6			

 Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 01832 Tel. 978.374.7744 Fax. 978.374.7799	<b>TEST BORING LOG</b>								Boring No. <b>B - 7</b> Page 1 of 1			
	Project		Bow Complex		GSI Project No.		211280		Elevation			
	Location		Bow, NH		Project Mgr.		Harry Wetherbee		Datum			
	Client		H.L. Turner Group		Inspector		Evan White		Date Started		10/5/2011	
	Contractor		Expedition Drilling		Checked By		Harry Wetherbee		Date Finished		10/5/2011	
	Driller		Steve Calavette		Rig Make & Model		CME		Rig Model		CME53	
	Item:		Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	Hammer Type: <input type="checkbox"/> Track <input checked="" type="checkbox"/> ATV <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Bomb. <input type="checkbox"/> Geoprobe <input type="checkbox"/> Doughnut <input type="checkbox"/> Tripod <input type="checkbox"/> Other <input checked="" type="checkbox"/> Automatic  <input type="checkbox"/> Winch <input type="checkbox"/> Cat Head <input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head			
	Type		HSA		SS		<input type="checkbox"/> Track	<input checked="" type="checkbox"/> ATV				
	Inside Diameter (in.)		2 3/4"		ST		<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geoprobe				
	Hammer Weight (lb)				140		<input type="checkbox"/> Tripod	<input type="checkbox"/> Other				
Hammer Fall (in.)				30"		<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head					
<b>Sample Data</b> Depth (ft)      Casing (Blows/ft)      No.      Depth (ft)      Rec (in.)      SPT (Bl./6-in.)      Rock RQD (%)      PID Rdg. (ppm)      Stratum Change (ft)											<b>Soil-Rock Visual Classification and Description</b> (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)	
0		S-1	10-12	0	60/1						Spoon refusal at 10'1" (rock in tip)	
5												
10												
15												
20												
<b>Water Level Data</b>											Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe  Cohesive Soils N-Value 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30: Very Stiff Over 30: Hard  Granular Soils N-Value 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense	
Date	Time	Depth (ft) to:			Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core G = Geoprobe							
		Bott. of Casing	Bott. of Hole	Water								
Trace (0 to 5%),   Little (10 to 20%),   Some (20 to 35%),   And (35 to 50%)											<b>B - 7</b>	
Notes:												

## APPENDIX C

### RECOMMENDED PROGRAM FOR STRUCTURAL TESTS AND INSPECTIONS FOR SOILS AND FOUNDATIONS



# GEOTECHNICAL SERVICES, INC.

## RECOMMENDED PROGRAM FOR STRUCTURAL TESTS AND INSPECTIONS FOR SOILS AND FOUNDATIONS

### A. Program for Structural Tests and Inspections (IBC2009)

1. Structural tests and inspections of soils and foundation work are for the purpose of providing assurance to the Owner, Building Official, and Structural Engineer of Record, that the construction complies with the structural design components associated with the work performed by the Geotechnical Engineer of Record (GE). These tests and inspections are for quality assurance audits and their implementation does not relieve the Contractor or Sub-Contractors of their responsibility for quality control of the work and any design for which they are responsible.
2. The GE will direct the implementation of this program and select any structural inspectors required to undertake the program.
3. Fees and costs related to the implementation of this program will be borne by the Owner.

### B. Testing Agency and Personnel Requirements

1. Comply with the following requirements:
  - a. Testing Agency shall have had a minimum of five years experience in performing the type and scope of work required for this project.
  - b. Any Individual performing the inspection and/or testing of cast-in-place concrete work shall be qualified on the basis of certification and/or satisfactorily documented work experience appropriate to the assigned task.

### C. Criteria for Structural Tests and Inspections:

1. Comply with following documents
  - a. Approved Contract Documents and Geotechnical Engineering Report.
  - b. Approved Shop Drawings, as applicable.
  - c. IBC2009 Building Code
    1. Chapter 17 - Structural Tests and Special Inspections.
    2. Chapter 18 - Soils and Foundations
    3. Chapter 20 - Concrete.
  - d. ASTM Standards.

### D. Verification of Bearing Strata

1. Observe and test footing excavations to verify conformance to approved Contract Documents and Geotechnical Report.
2. Verify that the foundation is of proper-size and depth and free of any loose, deleterious, or foreign material.
3. Inspect and verify the subgrade supporting the footings of buildings or structures immediately prior to the placement of plain or reinforced concrete.

### E. Inspection of Prepared Fill

1. Site Preparation.
  - a. Prior to placement of the prepared fill, determine that the site has been prepared in accordance with the approved Contract Documents and Geotechnical Report.
2. During Fill Placement.
  - a. During the placement and compaction of the fill material, determine that the material being used and the maximum lift thicknesses comply with the approved Contract Documents and Geotechnical Report.
3. Evaluation of In-Place Density.
  - a. Determine, at the approved frequency, that the in-place density of the compacted fill complies with the approved Contract Documents and Geotechnical Report.





## TOWN CENTER UPGRADE REPORT

### III. ASSESSMENT OF HAZARDOUS MATERIALS IN THE CURRENT BUILDINGS

As requested, TTG contracted with RPF Associates Inc. to complete a survey of the hazardous materials of the buildings.

Although the community building was reported to be free of hazardous materials, there were floor tiles containing asbestos that remained under the wall partitions and some of the wall panels are transite that also contains asbestos. Asbestos could also be found in the caulking around the community center door. No other hazardous materials were found during the survey.

The survey only addressed "accessible asbestos".

The police department and public works building was constructed in the late 1980's and therefore there were no hazardous materials found to have been used in the construction of the building. There was no asbestos found at the Police/DPW building and the Rescue Building. No mold was observed in the Police/DPW building. We did observe an area that could be mold in the Community Building women's bathroom. It is on an interior gypsum wall. If the substance is found to be mold, it could be easily removed.

One item that may need to be addressed is the presence of PCB's in the caulking at the community building. Due to the age of the police/DPW building, PCB's in the caulking are not a concern. The following paragraphs that are in italics are taken from the Environmental Protection Agency's website:

*In recent years, EPA has learned that caulk containing potentially harmful polychlorinated biphenyls (PCBs) was used in many buildings, including schools, in the 1950s through the 1970s. In general, schools and buildings built after 1978 do not contain PCBs in caulk. On September 25, 2009, EPA announced new guidance for school administrators and building managers with important information about managing PCBs in caulk and tools to help minimize possible exposure. Through [EPA's Regional PCB Coordinators](#), the Agency will also assist communities in identifying potential problems and, if necessary, developing plans for PCB testing and removal.*

*The EPA also announced additional research into this issue. There are several unresolved scientific questions that must be better understood to assess the magnitude of the problem and identify the best long-term solutions. For example, the link between the concentrations of PCBs in caulk and PCBs in the air or dust is not well understood. The Agency is doing research to determine the sources and levels of PCBs in schools and to evaluate different strategies to reduce exposures. The results of this research will be used to provide further guidance to schools and building owners as they develop and implement long-term solutions. Read more about [Research on PCBs in Caulk](#).*



## TOWN CENTER UPGRADE REPORT

Due to common use of PCB in caulk in the 1950s, when the community building was constructed, PCB may be present in the caulk. Since there are no immediate plans to alter the building, our interpretation is that testing is not required at this time. However, in Phase II of the project when the building is proposed to be demolished, the caulking should be tested and properly disposed of if there are any hazardous materials found. We would recommend and have included a line item in the budget for the demolition of the building in Phase II in case PCB's are found in the caulking.

The full RPF Associates report is attached.

In Appendix "C" of this report, there are reports prepared by RPF Associates from 2009 and 2010 which address the presence of hazardous materials in both the community building and police and DPW building, as well as testing that was done to address air quality issues at the police and DPW building.

September 21, 2011

Mr. William Hickey  
H.L. Turner Group, Inc.  
27 Locke Road  
Concord, NH 03301-1126

Re: Town of Bow, New Hampshire  
Police Department, Community Building and Rescue Building  
Building Survey Findings  
RPF File No. 114467

Dear Mr. Hickey:

On September 19, 2011, RPF Environmental, Inc. (RPF) conducted a survey at the Bow Police Department, the Bow Community Building and the Rescue Building located in Bow NH. The survey was performed in the buildings as designated by you for accessible hazardous building material as indicated herein. Below is a summary of findings, discussion of the results and preliminary recommendations for proper management of the identified hazardous building material. Attached to this report are the survey data tables, laboratory results, survey methodologies and limitations.

This report is not intended to be used as an abatement specification. Adequate project design documents should be prepared prior to performing any abatement.

## Summary of Findings

The Bow Police Department is located at the south end of the Bow Public Works Department at 12 Robinson Road in Bow, NH. This portion of the building is a 2 story masonry constructed building with various interior finishes. The Bow Community Center is a 2 story steel frame building located at 2 Knox Marsh Road in Bow NH which houses both the Bow Fire Department and the Bow Recreation Department. The Rescue Building is a stand alone, 2 story wood frame building located behind the Bow Community Center on the same property.

The scope of the survey included accessible asbestos-containing building material in accordance with the initial asbestos inspection requirements prior to renovation or demolition work as stated in the State regulations and applicable federal regulations. In addition, the survey included screening for lead paint (LP), polychlorinated biphenyls (PCB) light ballasts, mercury switches, and fluorescent light bulbs.

### Asbestos

Existing survey and testing information provided by Client to RPF during this project includes an asbestos survey report for the Bow Community Center prepared by RPF Associates, Inc. dated June 26, 2009. Based on the review of the existing survey records, the following materials are identified as ACBM:

- 9" Floor Tile
- Transite Panels
- Sink Basin Undercoating
- Caulking

In addition, several types of additional suspect asbestos-containing building material (ACBM) were observed by RPF, including friable and nonfriable suspect material. Based on the testing performed by RPF asbestos was detected in the following materials:

- Caulking (door related)

### Lead Paint

Based on the year of construction and extent of renovation conducted over the years, it is reasonable to assume that some lead paint (LP) is present. RPF conducted limited spot testing of paint and LP was confirmed to be present on various interior and exterior building components.

### Other Potential Hazardous Materials

Based on the RPF visual observations mercury containing switches, and fluorescent light bulbs are present throughout each of the buildings. In addition, several appliances (air conditioners, refrigerators, etc) were observed which are assumed to contain Freon or other CFCs.

Depending on the extent of renovation and final construction plans, proper abatement and/or management of the materials will be required in accordance with applicable State and federal regulations. Renovation and demolition plans should be reviewed by a certified industrial hygienist and a licensed project designer for possible asbestos impact issues. Based on the impact assessment and planned usage, technical specifications should be prepared for abatement, as applicable. A management plan should also be prepared to address any asbestos or other hazardous material scheduled to remain after construction.

## **Discussion of Findings**

### Asbestos-Containing Building Material

Several homogeneous groups of accessible suspect asbestos-containing building materials were identified in the buildings and areas surveyed. Suspect materials were identified based on current industry standards, EPA, and other guideline listings of potential suspect ACBM. A total of seventy-five (75) samples were extracted from the different groups of suspect material in accordance with EPA sampling protocols. Of the samples collected by RPF, asbestos was

detected in two (2) groups of suspect ACBM in addition to the materials identified in the previous survey report.

Table 1 of Appendix A includes a list of ACBM and asbestos identified in the building, EPA category listings, and asbestos content. A listing of the different homogenous groups of suspect material identified, samples collected, and analytical results is included in Table 2 of Appendix A.

The ACBM identified during this survey consists of nonfriable material. The nonfriable ACBM was observed to be in good to fair condition and, left undisturbed and properly managed, is unlikely to cause any major fiber release episodes.

The roofs of both the Rescue Building and the Police Department were specifically excluded from the scope of this survey. The Rescue Building roof was excluded since the Town of Bow recently had a new roof installed on this building. RPF was not able to access the Police Department roof at the time of this survey. The client was notified and RPF was instructed to forego performing any roof sampling as part of this survey.

The structure was in current use at the time of the survey and full destructive or exploratory survey methods were not feasible. As such, hidden or other inaccessible materials may be present within walls, floors or ceilings. Please reference the attached methodology and limitations.

#### Lead Paint Screening

Based on the type and age of building construction, it is reasonable to assume that various painted surfaces contain some lead. It is not uncommon in buildings such as these and that have had various renovations and upgrades to have both lead containing paint and non lead containing paint.

For the purposes of this survey, RPF performed screening for lead in paint using a Niton X-Ray Fluorescence (XRF) Meter of various interior painted surfaces throughout the Police Department and Rescue Building. The results of this lead screening area included at Table 3 of Appendix A. The results of this testing showed lead concentrations in various interior painted surfaces at ranging from 0.0 to 0.01 milligrams per square centimeter (mg/cm<sup>2</sup>). Screening of exterior surfaces was not performed as the exterior of the Police Department was unfinished masonry and the exterior of the Rescue Building was vinyl siding.

Current State of New Hampshire Lead Poisoning regulations consider any paint that contains greater than 1.0 mg/cm<sup>2</sup> to be lead-based paint. However, the intent of this survey was for construction purposes and preliminary demolition waste stream implications, not for compliance with NH Lead Poisoning regulations, HUD, or any regulatory abatement order.

Any surfaces with lead present should be managed in accordance with current rules and guidelines, including but not limited to OSHA worker safety rules and State and EPA waste handling and disposal regulations. U.S. Occupational Safety and Health Administration (OSHA) construction rules do not specify any "safe" or acceptable levels of lead within paint for the

purposes of occupational exposures. Therefore, construction work involving paint found to contain lead must be completed in accordance with OSHA regulations, not limited to the lead standard, 29 CFR 1926.62. Contractors completing work in areas found to contain lead, or where it is reasonable to assume lead may be present, should be notified of the presence (and potential presence) of lead and proper work protocols should be used.

### PCB Light Ballasts, Mercury Switches and Fluorescent Lamp Inventory

During this survey, RPF inventoried representative fluorescent lamps throughout each of the Police Department and Rescue buildings. Visual spot checks of accessible fixture ballasts were not feasible at the time of this survey as the lighting system was energized and accessing the interior of the light fixtures was not safe. However, the light fixtures observed appeared to be relatively new and are not likely to contain PCB-containing ballasts. Prior to disposal, these light fixtures should be inspected and checked to determine if the ballasts present include labels indicating that no PCBs are contained in the ballasts. Unmarked ballasts and ballasts without date stamps are assumed to be PCB containing.

During demolition of the lights, additional inspections should be performed as noted above. PCB and non-PCB ballasts should be segregated and packaged for waste disposal in accordance with State and federal requirements. There is a substantial cost difference for disposal of PCB ballasts versus non-PCB ballasts. It is also recommended that prior to proceeding with site work, it be requested that the Client or Building Owner provide documentation of PCB ballasts removed and replaced in the building, if available.

PCBs have been shown to cause chronic toxic effects and are a human carcinogen. PCBs are toxic according to the U.S. EPA and are a regulated material. The two primary federal laws that affect the handling of PCBs are the Toxic Substance Control Act and the Superfund Law (CERCLA). Other regulations include various State requirements, Department of Transportation, U.S. OSHA, and the Resource Conservation and Recovery Act. The regulations establish various requirements for the removal, handling, storage and disposal of PCBs.

With regard to light ballasts, approximately half were manufactured prior to 1979 and nearly all pre-1979 ballasts contain PCBs. Ballasts manufactured after July 1, 1978 and that do not contain PCBs are required to be clearly marked "No PCBs". Please note that is possible that post 1979 ballasts may contain some PCBs in the capacitor oils and more information should be requested if needed for applicable State and federal agencies. PCBs may also be present in common household appliances with small capacitors and as dielectric fluids other electric equipment such as transformers, switches and voltage regulators. Documentation of current conditions and in-depth hazard assessments is beyond the scope-of-work for this initial survey.

### Mercury Switches

No mercury switches were observed within the buildings included in this survey.

### Fluorescent Light Bulbs

Fluorescent and high intensity discharge lamps contain a small quantity of mercury that may pose a hazard to human health or the environment if the materials are not managed properly. The lamps may also contain lead solder material. Fluorescent light bulbs were observed in light fixtures on all floors of the buildings surveyed. Approximately 42 light fixtures were observed throughout the buildings surveyed for an approximate total of 105 fluorescent light bulbs.

### Chlorofluorocarbons

Several refrigerators were observed throughout the buildings surveyed which potentially contain Freon or other CFCs. These appliances should be properly handled and disposed of during any renovation or demolition activities.

## **Conclusions**

Based on the survey findings, the building was found to contain ACBM and other hazardous building material.

In accordance with current regulatory requirements, ACBM that may be impacted or disturbed (such that asbestos fiber release occurs) by renovation, demolition or other such activity must be removed by qualified, licensed firms. Although regulations for removal of nonfriable ACBM are somewhat less stringent than the requirements for friable ACBM, it should be noted that nonfriable ACBM that is subjected to grinding, abrasion, and other forces, could be rendered friable. In this event, the nonfriable ACBM would be re-categorized friable ACBM.

ACBM that will not be impacted by renovation or demolition activity may be left in place if managed properly and if the materials are maintained in good condition. ACBM to remain in the building should be included in an asbestos management plan and operations and maintenance (O&M) program detailing the measures to be used to safely occupy the building until the ACBM is fully removed. An accredited Management Planner should prepare the O&M Program in accordance with the guidelines set forth in 40 CFR Part 763 (AHERA).

Work impacting fluorescent light bulbs, mercury and CFCs must be performed in accordance with current State and federal standards, including but not limited safe work practices, engineering controls, proper waste packaging, and proper disposal.

Sufficiently in advance of the start of renovation and/or remediation work, abatement project design should be completed. As part the initial design steps any planned renovation and demolition activity should be reviewed for potential impact on ACBM. Asbestos removal is highly regulated at the State and federal level, and in some cases, at the local level also. Notification to NH Air Resources is required 10-days prior to the start of interior abatement work and demolition. Only qualified, trained, and licensed firms, as applicable, should be engaged to complete asbestos removal or other abatement activity. Asbestos abatement work must be designed (abatement specifications or work plan prepared) by accredited personnel.

All employees and contractors that may access or otherwise disturb areas with suspect ACBM present should be notified of the presence of ACBM and possible hidden ACBM, and the need to use caution when proceeding with work. Appropriate notifications, labeling and other hazard communications should be completed to all employees, contractors and others in accordance with US OSHA regulations and other applicable requirements (including asbestos labeling in accordance with 29 CFR Part 1926). The scope of RPF services for this survey did not include labeling of ACBM or hazard communications to other employees, building occupants, contractors, or subcontractors.

Documentation of current ACBM conditions and in-depth hazard assessment is beyond the scope-of-work for this initial survey. With the exception of the specific testing and analysis detailed herein, no other samples of materials, oil, water, ground water, air, or other suspect hazardous materials were collected in the course of this inspection that supports or denies these conclusions. No additional services beyond those explicitly stated herein were performed and none should be inferred or implied. The summary and conclusions are based on reasonably ascertainable information as described in this report. RPF Associates, Inc. makes no guarantees, warranties, or references regarding this property or the condition of the property after the period of this report.

If you have any questions at this time, or if you would like to discuss the project design process, please call our office.

Sincerely,  
RPF ENVIRONMENTAL, INC.

Allan D. Mercier  
EH&S Consultant  
Licensed Asbestos Inspector No. AI000316

Enclosures:

- Appendix A: Data and Analytical Tables
- Appendix B: Example Photographs
- Appendix C: General Information
- Appendix D: Summary of Methodology and Limitations

114467 092111 survey

## APPENDIX A

**TABLE 1**

**TOWN OF BOW**  
**POLICE DEPARTMENT, BOW COMMUNITY BUILDING AND RESCUE BUILDING**

**SUMMARY OF ACBM IDENTIFIED**

Building Material	Location	Approximate Quantity	EPA Category	Asbestos Results
<b>Police Department</b>				
Built-up Asphalt Roofing	Roof, throughout Police Dept. section of building	2,800 square feet	Category II Nonfriable	Assumed ACBM
<b>Bow Community Building</b>				
Transite Panels	Throughout Building	3,650 sq.ft.	Category II Nonfriable	20% Chrysotile
9" Floor Tile (various colors)	Located under interior walls throughout building, including the Rec Hall, Kitchen, Offices, Fire Chief's Offices and 2 <sup>nd</sup> floor common room	150 square feet	Category I Nonfriable	2%-5% Chrysotile
Door Caulking	Throughout Interior of Building	8 doors @ 17 linear feet/door	Category II Nonfriable	Trace Chrysotile
	Exterior, Main Entrance Doors (may be other locations)	1 door @ 20 linear feet	Category II Nonfriable	3% Chrysotile
<b>Rescue Building</b>				
Sink Basin Undercoating	Upper level kitchenette	4 square feet	Category II Nonfriable	5% Chrysotile

**Notes:**

- Table 1 does not include a listing of all ACBM and suspect ACBM present at the site, only the materials found to be ACBM during the limited testing of this limited survey. Full testing and inspections are required to further identify the types, locations and quantities of ACBM present at this site.
- Appendix C of the report contains further information on the EPA category listings. Please note that Category 1 and Category 2 nonfriable ACM are recategorized as friable and/or RACM under certain conditions. Current State asbestos regulations are more strict and comprehensive than the EPA NESHAPs requirements.
- All quantities are approximate only and should be confirmed during abatement project design and abatement bidding.
- It is likely that some concealed or inaccessible ACBM is present. Care should be used when renovating/demolishing inaccessible building space. Further explorative survey work may be necessary during design and/or in conjunction with demolition.

**TABLE 2**
**HL TURNER GROUP**  
**Bow Police Department**
**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS**  
**Polarized Light Microscopy – EPA 600/R-93/116 Method**
**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG01	Gypsum wallboard with joint compound, white, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG01b	Gypsum wallboard with joint compound, white, 1 <sup>st</sup> floor, lobby	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG01c	Gypsum wallboard with joint compound, white, 1 <sup>st</sup> floor, hallway in front of patrol	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG01d	Gypsum wallboard with joint compound, white, 1 <sup>st</sup> floor, communications center, bathroom	No Asbestos Detected	10% Cellulose, 5% Fiber Glass, 85% Non-fibrous
091911-HG01e	Gypsum wallboard with joint compound, white, 2 <sup>nd</sup> floor, conference room	No Asbestos Detected	10% Cellulose, 5% Fiber Glass, 85% Non-fibrous
091911-HG01f	Gypsum wallboard with joint compound, white, 2 <sup>nd</sup> floor, break room	No Asbestos Detected	10% Cellulose, 5% Fiber Glass, 85% Non-fibrous
091911-HG01g	Gypsum wallboard with joint compound, white, 2 <sup>nd</sup> floor, workout room	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG02-Floor Tile	12" floor tile, blue, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet	No Asbestos Detected	100% Non-fibrous
091911-HG02-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet	No Asbestos Detected	3% Cellulose 97% Non-fibrous
091911-HG02b-Floor Tile	12" floor tile, blue, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet	No Asbestos Detected	100% Non-fibrous
091911-HG02b-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet	No Asbestos Detected	4% Cellulose 96% Non-fibrous
091911-HG03-Floor Tile	Floor tile, tan, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet, beneath blue floor tile	No Asbestos Detected	100% Non-fibrous
091911-HG03-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet, beneath blue floor tile	No Asbestos Detected	3% Cellulose 97% Non-fibrous
091911-HG03b-Floor Tile	Floor tile, tan, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet, beneath blue floor tile	No Asbestos Detected	100% Non-fibrous
091911-HG03b-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, interview room off lobby, in janitor's closet, beneath blue floor tile	No Asbestos Detected	2% Cellulose 98% Non-fibrous
091911-HG03c-Floor Tile	Floor tile, tan, 1 <sup>st</sup> floor, booking room	No Asbestos Detected	100% Non-fibrous
091911-HG03c-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, booking room	No Asbestos Detected	3% Cellulose 97% Non-fibrous

**Notes:**

- Trace means less than 1%. SFP Means analysis was terminated because asbestos was detected on a previous homogenous sample during the survey work. Please reference the "HG" group number.
- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 2 (Continued)**
**HL TURNER GROUP**  
**Bow Police Department**

 Asbestos, Lead Paint, Radon, Mold, PCBs  
 ASTM Environmental Site Assessments  
 EPA, OSHA & State Training Programs  
 Air Quality Testing & Analysis  
 Industrial Hygiene Services  
 OSHA Compliance

**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS**  
**Polarized Light Microscopy – EPA 600/R-93/116 Method**
**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG04	Covebase adhesive, yellow and brown, 1 <sup>st</sup> floor, interview room, off lobby in janitor's closet	No Asbestos Detected	100% Non-fibrous
091911-HG04b	Covebase adhesive, yellow and brown, 1 <sup>st</sup> floor, booking room	No Asbestos Detected	100% Non-fibrous
091911-HG05	Suspended ceiling tile, tan, 1 <sup>st</sup> floor, lobby	No Asbestos Detected	50% Cellulose, 30% Fiber Glass, 10% Perlite, 10% Non-fibrous
091911-HG05b	Suspended ceiling tile, tan, 1 <sup>st</sup> floor, hallway in front of patrol room	No Asbestos Detected	50% Cellulose, 30% Fiber Glass, 10% Perlite, 10% Non-fibrous
091911-HG05c	Suspended ceiling tile, tan, 2 <sup>nd</sup> floor, conference room	No Asbestos Detected	50% Cellulose, 30% Fiber Glass, 10% Perlite, 10% Non-fibrous
091911-HG06	Suspended ceiling tile, tan, 1 <sup>st</sup> floor, lobby	No Asbestos Detected	40% Cellulose, 40% Fiber Glass, 10% Perlite, 10% Non-fibrous
091911-HG06b	Suspended ceiling tile, tan, 1 <sup>st</sup> floor, hallway in front of patrol room	No Asbestos Detected	40% Cellulose, 40% Fiber Glass, 10% Perlite, 10% Non-fibrous
091911-HG07	Carpet adhesive, yellow, 1 <sup>st</sup> floor, patrol room	No Asbestos Detected	3% Cellulose 97% Non-fibrous
091911-HG07b	Carpet adhesive, yellow, 2 <sup>nd</sup> floor, conference room	No Asbestos Detected	2% Synthetic Fibers 98% Non-fibrous
091911-HG07c	Carpet adhesive, yellow, 2 <sup>nd</sup> floor, workout room	No Asbestos Detected	3% Synthetic Fibers 97% Non-fibrous
091911-HG08-Floor Tile	12" floor tile, gray, 1 <sup>st</sup> floor, booking room	No Asbestos Detected	100% Non-fibrous
091911-HG08-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, booking room	No Asbestos Detected	100% Non-fibrous
091911-HG08-Floor Tile	12" floor tile, gray, 1 <sup>st</sup> floor, kitchenette	No Asbestos Detected	100% Non-fibrous
091911-HG08-Mastic	Mastic, yellow, 1 <sup>st</sup> floor, kitchenette	No Asbestos Detected	100% Non-fibrous
091911-HG09	Sink basin undercoating, white, 1 <sup>st</sup> floor, kitchenette	No Asbestos Detected	10% Cellulose 90% Non-fibrous
091911-HG09b	Sink basin undercoating, white, 2 <sup>nd</sup> floor, break room	No Asbestos Detected	10% Cellulose 90% Non-fibrous
091911-HG10	Skim coat, white, 2 <sup>nd</sup> floor, record's room	No Asbestos Detected	100% Non-fibrous

Notes:

- Trace means less than 1%. SFP Means analysis was terminated because asbestos was detected on a previous homogenous sample during the survey work. Please reference the "HG" group number.
- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 2 (Continued)**
**HL TURNER GROUP**  
**Bow Police Department**

 Asbestos, Lead Paint, Radon, Mold, PCBs  
 ASTM Environmental Site Assessments  
 EPA, OSHA & State Training Programs  
 Air Quality Testing & Analysis  
 Industrial Hygiene Services  
 OSHA Compliance

**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS**  
**Polarized Light Microscopy – EPA 600/R-93/116 Method**
**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG10b	Skim coat, white, 2 <sup>nd</sup> floor, record's room	No Asbestos Detected	100% Non-fibrous

**Notes:**

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- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 2 (Continued)**

**HL TURNER GROUP**  
**Bow Fire Department – Recreational Building**

**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS**  
**Polarized Light Microscopy – EPA 600/R-93/116 Method**

**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG201	Caulk, gray, roof, southwest corner, at seam of metal roof	No Asbestos Detected	100% Non-fibrous
091911-HG201b	Caulk, gray, roof, west side, at seam of metal roof	No Asbestos Detected	100% Non-fibrous
091911-HG202	Asphalt shingle roofing, black, roof, rec. center, above west entrance, top layer	No Asbestos Detected	25% Cellulose 75% Non-fibrous
091911-HG202b	Asphalt shingle roofing, black, roof, rec. center, above west entrance, top layer	No Asbestos Detected	25% Cellulose 75% Non-fibrous
091911-HG203	Asphalt shingle roofing, black, roof, rec. center, above west entrance, bottom layer	No Asbestos Detected	25% Cellulose 75% Non-fibrous
091911-HG203b	Asphalt shingle roofing, black, roof, rec. center, above west entrance, bottom layer	No Asbestos Detected	25% Cellulose 75% Non-fibrous
091911-HG204	Caulk, black, exterior, parks and rec. door	No Asbestos Detected	5% Cellulose 95% Non-fibrous
091911-HG204b	Caulk, black, exterior, parks and rec. door	No Asbestos Detected	5% Cellulose 95% Non-fibrous
091911-HG205	Caulk, white, exterior, fire department, around window trim	No Asbestos Detected	100% Non-fibrous
091911-HG205b	Caulk, white, exterior, fire department, around window trim	No Asbestos Detected	100% Non-fibrous
091911-HG206	Caulk, white, community center, main entrance, caulk around main door	3% Chrysotile	97% Non-fibrous
091911-HG206b	Caulk, white, community center, main entrance, caulk around main door	*SFP	*SFP
091911-HG207	Caulk, gray, roof, front parapet wall, around edge of metal cap	No Asbestos Detected	100% Non-fibrous
091911-HG207b	Caulk, gray, roof, front parapet wall, around edge of metal cap	No Asbestos Detected	100% Non-fibrous

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Notes:

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- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 2 (Continued)**
**HL TURNER GROUP  
Rescue Building**
**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS  
Polarized Light Microscopy – EPA 600/R-93/116 Method**
**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG101	Gypsum, white, lower level, garage	No Asbestos Detected	5% Cellulose, 5% Fiber Glass, 90% Non-fibrous
091911-HG101b	Gypsum, white, lower level, garage	No Asbestos Detected	5% Cellulose, 5% Fiber Glass, 90% Non-fibrous
091911-HG101c	Gypsum, white, lower level, garage	No Asbestos Detected	10% Cellulose, 5% Fiber Glass, 85% Non-fibrous
091911-HG102	Mastic, black, stairwell, between lower level and upper level	No Asbestos Detected	5% Cellulose 95% Non-fibrous
091911-HG102b	Mastic, black, stairwell, between lower level and upper level	No Asbestos Detected	5% Cellulose 95% Non-fibrous
091911-HG103	Textured ceiling surfacing, white, upper level, conference area	No Asbestos Detected	100% Non-fibrous
091911-HG103b	Textured ceiling surfacing, white, upper level, women's bathroom	No Asbestos Detected	100% Non-fibrous
091911-HG103c	Textured ceiling surfacing, white, upper level, hallway	No Asbestos Detected	100% Non-fibrous
091911-HG103d	Textured ceiling surfacing, white, upper level, conference area	No Asbestos Detected	100% Non-fibrous
091911-HG103e	Textured ceiling surfacing, white, upper level, conference area	No Asbestos Detected	100% Non-fibrous
091911-HG104-Linoleum	Linoleum, yellow, upper level, hallway by stairs	No Asbestos Detected	15% Cellulose, 5% Fiber Glass, 80% Non-fibrous
091911-HG104-Adhesive	Adhesive, upper level, hallway by stairs	No Asbestos Detected	100% Non-fibrous
091911-HG104b-Linoleum	Linoleum, yellow, upper level, men's bathroom	No Asbestos Detected	15% Cellulose, 5% Fiber Glass, 80% Non-fibrous
091911-HG104b-Adhesive	Adhesive, upper level, men's bathroom	No Asbestos Detected	100% Non-fibrous
091911-HG105	Carpet adhesive, yellow, upper level, conference area	No Asbestos Detected	100% Non-fibrous
091911-HG105b	Carpet adhesive, yellow, upper level, conference area	No Asbestos Detected	100% Non-fibrous

**Notes:**

- Trace means less than 1%. SFP Means analysis was terminated because asbestos was detected on a previous homogenous sample during the survey work. Please reference the "HG" group number.
- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**Table 2 (Continued)**
**HL TURNER GROUP**  
**Rescue Building**

 Asbestos, Lead Paint, Radon, Mold, PCBs  
 ASTM Environmental Site Assessments  
 EPA, OSHA & State Training Programs  
 Air Quality Testing & Analysis  
 Industrial Hygiene Services  
 OSHA Compliance

**SUMMARY OF BULK MATERIAL SAMPLING AND RESULTS**  
**Polarized Light Microscopy – EPA 600/R-93/116 Method**
**Samples Collected: September 19, 2011**

Sample ID	Sample Description	Asbestos Content	Other Content
091911-HG106	Gypsum with joint compound, upper level, conference area	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG106b	Gypsum with joint compound, upper level, conference area	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG106c	Gypsum with joint compound, upper level, men's bathroom	No Asbestos Detected	10% Cellulose, 5% Fiber Glass 85% Non-fibrous
091911-HG106d	Gypsum with joint compound, upper level, women's bathroom	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG106e	Gypsum with joint compound, upper level, utility closet	No Asbestos Detected	15% Cellulose 85% Non-fibrous
091911-HG107-Laminate	Laminate, brown, upper level, kitchenette	No Asbestos Detected	80% Cellulose 20% Non-fibrous
091911-HG107-Adhesive	Adhesive, upper level, kitchenette	No Asbestos Detected	100% Non-fibrous
091911-HG108	Sink basin undercoating, white, upper level, kitchenette	5% Chrysotile	95% Non-fibrous
091911-HG109	Window glaze, white, upper level, conference area	No Asbestos Detected	100% Non-fibrous
091911-HG109b	Window glaze, white, upper level, conference area	No Asbestos Detected	100% Non-fibrous

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**Notes:**

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- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 3**  
**HL TURNER GROUP**  
**Bow Police Department**  
**XRF SURVEY RESULTS**

**Sample Collected: September 19, 2011**

Reading No.	Time	Component	Substrate	Color	Location	Result (mg/cm <sup>2</sup> )	Range (+/-)
2310	8:29:00 AM	---	---	---	SRM 2573	0.9	0.1
2311	8:30:00 AM	---	---	---	SRM 2572	1.7	0.5
2312	9:43:00 AM	Door trim	Wood	Green	1 <sup>st</sup> floor, booking room	0	0.03
2313	9:44:00 AM	Wall	GWB	Green	1 <sup>st</sup> floor, booking room	0	0.02
2315	9:44:00 AM	Interior door trim	Metal	Green	1 <sup>st</sup> floor, booking room	0	0.02
2316	9:45:00 AM	Wall	GWB	Green	1 <sup>st</sup> floor, booking room	0	0.02
2317	9:46:00 AM	Interior door trim	Metal	Green	Hallway at patrol office	0	0.02
2318	9:46:00 AM	Wall	GWB	Green	1 <sup>st</sup> floor, patrol office	0	0.02
2319	9:47:00 AM	Wall	GWB	Blue	1 <sup>st</sup> floor, Det. office	0	0.02
2320	9:47:00 AM	Window trim	Wood	White	1 <sup>st</sup> floor, Det. office	0	0.02
2321	9:48:00 AM	Window sill	Wood	White	1 <sup>st</sup> floor, Det. office	0	0.02
2322	9:48:00 AM	Window trim	Wood	Gray	1 <sup>st</sup> floor, hallway window into interview room	0	0.02
2323	10:50:00 AM	Door trim	Metal	White	2 <sup>nd</sup> floor	0.01	0.05
2324	10:51:00 AM	Door trim	Metal	White	2 <sup>nd</sup> floor, administrator's office	0	0.02
2325	10:52:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, hall outside administrator's office	0	0.02
2326	10:52:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, conference room	0	0.02
2327	10:52:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, hall	0	0.02
2328	10:52:00 AM	Door trim		White	2 <sup>nd</sup> floor, community resource room	0	0.02
2329	10:54:00 AM	Window trim	Wood	Varnish	2 <sup>nd</sup> floor, conference room window	0.01	0.04
2330	10:55:00 AM	Wall		White	2 <sup>nd</sup> floor, wall	0	0.02
2331	10:55:00 AM	Door trim	Metal	White	2 <sup>nd</sup> floor, women's room	0	0.02
2332	10:55:00 AM	Door	Wood	Varnish	2 <sup>nd</sup> floor, women's room	0	0.06
2333	10:56:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, locker room wall	0	0.02
2334	10:56:00 AM	Door trim	Metal	White	2 <sup>nd</sup> floor, juvenile services	0	0.02
2335	10:57:00 AM	Block wall	Concrete	White	2 <sup>nd</sup> floor, exercise room	0	0.02
2337	10:58:00 AM	Door	Wood	Varnish	2 <sup>nd</sup> floor, exercise room	0	0.02
2338	10:59:00 AM	Wall	Wood	Gray	2 <sup>nd</sup> floor, electrical panel	0.01	0.08
2339	10:59:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor supplies room	0	0.02

**TABLE 3 (Continued)**
**HL TURNER GROUP  
Bow Police Department**
**XRF SURVEY RESULTS**

 Asbestos, Lead Paint, Radon, Mold, PCBs  
 ASTM Environmental Site Assessments  
 EPA, OSHA & State Training Programs  
 Air Quality Testing & Analysis  
 Industrial Hygiene Services  
 OSHA Compliance

Reading No.	Time	Component	Substrate	Color	Location	Result (mg/cm <sup>2</sup> )	Range (+/-)
2340	11:17:00 AM	---	---	---	SRM 2573	1.1	0.2
2341	11:18:00 AM	---	---	---	SRM 2575	0.4	0.2
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**Notes:**

- Lead based paint as defined by current state of NH lead poisoning prevention regulations, is any paint that contains in excess of 1.0 mg/cm<sup>2</sup> of lead.
- OSHA does not currently establish a percent lead for lead paint.
- mg/cm<sup>2</sup> milligrams per centimeter square
- cps means hertz measurement
- Please reference the full report for discussions and additional information and limitations pertaining to these results.

**TABLE 3 (Continued)**
**HL TURNER GROUP  
Rescue Building**
**XRF SURVEY RESULTS**
**Sample Collected: September 19, 2011**

Reading No.	Time	Component	Substrate	Color	Location	Result (mg/cm <sup>2</sup> )	Range (+/-)
2340	11:17:00 AM	---	---	---	SRM 2573	1.1	0.2
2341	11:18:00 AM	---	---	---	SRM 2575	0.4	0.2
2343	11:47:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, conference room, upper level	0	0.02
2344	11:48:00 AM	Window trim	Wood	White	2 <sup>nd</sup> floor, conference room	0	0.03
2345	11:48:00 AM	Door	Wood	White	2 <sup>nd</sup> floor, bathroom	0	0.02
2346	11:48:00 AM	Door trim	Wood	White	2 <sup>nd</sup> floor, storage closet	0	0.02
2347	11:49:00 AM	Wall	GWB	White	2 <sup>nd</sup> floor, storage closet	0	0.02
2349	11:51:00 AM		---	---	SRM 2575	0.3	0.21

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 Asbestos, Lead Paint, Radon, Mold, PCBs  
 ASTM Environmental Site Assessments  
 EPA, OSHA & State Training Programs  
 Air Quality Testing & Analysis  
 Industrial Hygiene Services  
 OSHA Compliance

**Notes:**

- Lead based paint as defined by current state of NH lead poisoning prevention regulations, is any paint that contains in excess of 1.0 mg/cm<sup>2</sup> of lead.
- OSHA does not currently establish a percent lead for lead paint.
- mg/cm<sup>2</sup> milligrams per centimeter square
- cps means hertz measurement
- Please reference the full report for discussions and additional information and limitations pertaining to these results.

## APPENDIX B



Bow Police Department



Bow Rescue Building



Bow Community Building/Fire Department

## APPENDIX C

## INDUSTRY AND REGULATORY OVERVIEW

### General Overview

Asbestos is the name for a group of naturally occurring minerals that separate into strong, very fine fibers. The adverse health effects associated with asbestos exposure have been extensively studied for many years. Results of these studies and epidemiological investigations have demonstrated that inhalation of asbestos fibers may lead to increased risk of developing one or more diseases. In all cases, extreme care must be used not to disturb asbestos-containing materials or to create fiber release episodes.

Asbestos-containing building material (ACBM) that is in good condition, and is not damaged or otherwise disturbed, is not likely release asbestos fibers into the air if it is managed properly. When properly managed, release of asbestos fibers into the air or surrounding areas is prevented or minimized, and the risk of asbestos-related disease can be reduced to a negligible level. However, ACBM can become hazardous when, due to damage, disturbance, or deterioration over time, they release fibers into the air. In the event of fiber release without proper controls, elevated airborne concentrations of asbestos create a potential hazard for any employees and building occupants in the affected areas.

ACBM is classified by the different regulatory agencies based on friability. Friable ACBM, when dry, can be crumbled, pulverized, or reduces to powder by hand pressure. Considering that a primary concern when dealing with ACBM is airborne fibers or the potential for exposure to airborne fibers, friable ACBM is typically considered to present more of a health risk as compared with nonfriable ACBM. Nonfriable ACBM is further grouped by the EPA into Category I and Category II nonfriable ACBMS depending on the specific type of ACM. It should be noted that nonfriable ACBM that is rendered friable, or in some cases, subjected to certain activities and forces during work, may also be considered regulated as friable ACBM.

### Health Issues

The three primary diseases most often related to asbestos exposure are asbestosis, mesothelioma, and lung cancer. Asbestosis is a fibrous scarring of the lung caused by scar tissue formations in the lung in response to the asbestos fibers. Mesothelioma is a rare cancer of the lining of the lungs or the lining of the abdomen. Exposure to all types of asbestos increases the risk of developing lung cancer and asbestosis. Other diseases found more often among persons exposed to asbestos include cancer of the esophagus, stomach, colon, and pancreas; pleural plaques and pleural thickening; and pleural effusion.

Exposure to airborne asbestos rarely causes immediate health problems. The diseases related to asbestos may develop over a period of 10 to 30 years. Studies have shown that there is dose-response relationship between exposure to asbestos and disease -or the more asbestos inhaled over an extended period, the greater the risk of developing an asbestos-related disease. Smoking, in combination with asbestos exposure, can increase the risk of disease by 50 percent.

### Regulatory Overview

Asbestos is highly regulated at the federal, state, and local levels. To date, the two primary Federal agencies responsible for generating asbestos-related regulations are the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). Additionally, regulations regarding asbestos vary from state-to-state and, in some cases, locally.

Regulations promulgated by the Environmental Protection Agency (EPA) include:

Asbestos Abatement Projects; Worker Protection Rule  
Title 40 Part 763, Sub-part G of the Code of Federal Regulations

Asbestos School Hazard Abatement Reauthorization Act (ASHARA)  
Training Requirements of (AHERA) Regulation  
Asbestos Containing Materials in Schools Final Rule & Notice  
Title 40, Part 763, Sub-part E, Code of Federal Regulations

Asbestos Hazard Emergency Response Act (AHERA) Regulation  
Asbestos Containing Materials in Schools Final Rule & Notice  
Title 40, Part 763, Sub-part E of the Code of Federal Regulations

National Emission Standard for Hazardous Air Pollutants (NESHAPS)  
National Emission Standard for Asbestos, Title 40, Part 61, Sub-part A,  
and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

The US Occupational Safety and Health Administration (OSHA) has also developed regulations for asbestos (abatement and related issues) including:

Occupational Exposure to Asbestos, Tremolite,  
Anthophyllite, and Actinolite; Final Rules

Title 29, Part 1910, Section 1001 and  
Part 1926, Section 1101 of the Code of Federal Regulations

Respiratory Protection  
Title 29, Part 1910, Section 134 of the Code of Federal Regulations  
Other related sections of 29 CFR 1926 and 29 CFR 1910

Individual state agencies must also be consulted for current updated copies of state rules and regulations. Regulations and requirements can very significantly from state to state.

In summary, based on current regulatory requirements, ACBM, which may be impacted or disturbed (such that asbestos fiber release occurs) by renovation, demolition, or other such activity, must be removed by qualified, licensed firms. ACBM, which will not be impacted or disturbed by renovation or demolition activity, may be left in place if managed properly and if the materials are maintained in good condition. A qualified, licensed project designer and certified industrial hygienist must design abatement work. All abatement should be monitored, tested, and inspected by a qualified EH&S firm/certified industrial hygienist. ACBM that will not be impacted or disturbed by renovation or demolition activity may be left in place if managed properly and if the materials are maintained in good condition.

## APPENDIX D

## LIMITATIONS 0508

1. The observations and conclusions presented in the Report were based solely upon the services described herein, and not on scientific tasks or procedures beyond the RPF Associates, Inc. Scope of Work (SOW) as discussed in the proposal and/or the RPF. The conclusions and recommendations are based on visual observations and testing, limited as indicated in the Report, and were arrived at in accordance with generally accepted standards of industrial hygiene practice and asbestos professionals. The nature of this survey or monitoring service was limited as indicated herein and in the report or letter of findings. Further testing, survey, and analysis is required to provide more definitive results and findings.
2. For site survey work, observations were made of the designated accessible areas of the site as indicated in the Report. While it was the intent of RPF to conduct a survey to the degree indicated, it is important to note that not all suspect ACM material in the designated areas were specifically assessed and visibility was limited, as indicated, due to the presence of furnishings, equipment, solid walls and solid or suspended ceilings throughout the facility and/or other site conditions. Asbestos or hazardous material may have been used and may be present in areas where detection and assessment is difficult until renovation and/or demolition proceeds. Access and observations relating to electrical and mechanical systems within the building were restricted or not feasible to prevent damage to the systems and minimize safety hazards to the survey team.

Although assumptions may have been stated regarding the potential presence of inaccessible or hidden asbestos and other hazardous material, full inspection findings for all asbestos and other hazardous material requires the use of full destructive survey methods to identify possible inaccessible suspect material and this level of survey was not included in the SOW for this project. For preliminary survey work, sampling and analysis as applicable was limited and a full survey throughout the site was not performed. Only the specific areas and /or materials indicated in the report were included in the SOW. This inspection did not include a full hazard assessment survey, full testing or bulk material, or testing to determine current dust concentrations of asbestos in and around the building. Inspection results should not be used for compliance with current EPA and State asbestos in renovation/demolition requirements unless specifically stated as intended for this use in the RPF report and considering the limitations as stated therein and within this limitations document.

Where access to portions of the surveyed area was unavailable or limited, RPF renders no opinion of the condition and assessment of these areas. The survey results only apply to areas specifically accessed by RPF during the survey. Interiors of mechanical equipment and other building or process equipment may also have asbestos and other hazardous material present and were not included in this inspection. For renovation and demolition work, further inspection by qualified personnel will be required during the course of construction activity to identify suspect material not previously documented at the site or in this survey report. Bordering properties were not investigated and comprehensive file review and research was not performed.

For lead in paint, observations were made of the designated accessible areas of the site as indicated in the Report. Limited testing may have been performed only to the extent indicated in the text of the report. In order to conduct thorough hazard assessments for lead exposures, representative surface dust testing, air monitoring and other related testing throughout the building, should be completed. This type of in depth testing and analysis was beyond the scope of services for the initial inspection. For lead surveys with XRF readings, it is recommended that surfaces found to have LBP or trace amount of lead detected with readings of less than 4 mg/cm<sup>2</sup> be confirmed using laboratory analysis, if more definitive results are required. Substrate corrections were conducted in accordance with the XRF manufacturer guidelines; however, substrate corrections involving destructive sampling or damage to existing surfaces (to minimize XRF read-through) were not completed. In some instances, destructive testing may be required for more accurate results. In addition, depending on the specific thickness of the paint films on different

areas of a building component, differing amounts of wear, and other factors, XRF readings can vary slightly, even on the same building component. Unless otherwise specifically stated in the scope of services and final report, lead testing performed is not intended to comply with NH Admn Rule He-P 1600 or other state and federal regulations pertaining to childhood lead poisoning regulations.

3. Air testing is to be considered a “snap shot” of conditions present on the day of the survey with the understanding that conditions may differ at other times or dates or operational conditions for the facility. Results are also limited based on the specific analytical methods utilized. For phase contrast microscopy (PCM) total airborne fiber testing, more sensitive asbestos-specific analysis using transmission electron microscopy (TEM) can be performed upon request.
4. For asbestos bulk and dust testing, although polarize light microscopy (PLM) is the method currently recognized in State and federal regulations for asbestos identification in bulk samples, some industry studies have found that PLM may not be sensitive enough to detect all of the asbestos fibers in certain nonfriable material, vermiculite type insulation, soils, surface dust, and other materials requiring more sensitive analysis to identify possible asbestos fibers. In the event that more definitive results are requested, RPF recommends that confirmation testing be completed using TEM methods or other analytical methods as may be applicable to the material.
5. For hazardous building material inspection or survey work, RPF followed applicable industry standards; however, RPF does not warrant or certify that all asbestos or other hazardous materials in or on the building has been identified and included in this report. Various assumptions and limitations of the methods can result in missed materials or misidentification of materials due to several factors including but not limited to: inaccessible space due to physical or safety constraints, space that is difficult to reach to fully inspect, assumptions regarding the determination of homogenous groups of suspect material, assumptions regarding attempts to conduct representative sampling, and potential for varying mixtures and layers of material sampled not being representative of all areas of similar material.
6. Full assessments often requires multiple rounds of sampling over a period of time for air, bulk material, surface dust and water. Such comprehensive testing was beyond the scope of RPF services. In addition clearance testing for abatement, as applicable, was based on the visual observations and limited ambient area air testing as indicated in the report and in accordance with applicable state and federal regulations. The potential exists that microscopic surface dust remains with contaminant present even in the event that the clearance testing meets the state and federal requirements. Likewise for building surveys, visual observations are not sufficient alone to detect possible contaminant in settled dust. Unless otherwise specifically indicated in the report, surface dust testing was not included in the scope of the RPF services.
7. For abatement or remediation monitoring services: RPF is not responsible for observations and test for specific periods of work that RPF did not perform full shift monitoring of construction, abatement or remediation activity. In the event that problems occurred or concerns arose regarding contamination, safety or health hazards during periods RPF was not onsite, RPF is not responsible to provide documentation or assurances regarding conditions, safety, air testing results and other compliance issues. RPF may have provided recommendations to the Client, as needed, pertaining to the Client’s Contractor compliance with the technical specifications, schedules, and other project related issues as agreed and based on results of RPF monitoring work. However, actual enforcement, or waiving of, contract provisions and requirements as well as regulatory liabilities shall be the responsibility of Client and Client’s Contractor(s). Off-site abatement activities, such as waste transportation and disposal, were not monitored or inspected by RPF.
8. For services limited to clearance testing following abatement or remediation work by other parties: The testing was limited to clearance testing only and as indicated in the report and a site assessment for possible environmental health and safety hazards was not performed as part of the scope of this testing.

Client, or Client's abatement contractor as applicable, was responsible for performing visual inspections of the work area to determine completeness of work prior to air clearance testing by RPF.

9. For site work, including but not limited to air clearance testing services, in which RPF did not provide full site safety and health oversight, abatement design, full shift monitoring of all site activity, RPF expresses no warranties, guarantees or certifications of the abatement work conducted by the Client or other employers at the job site(s), conditions during the work, or regulatory compliance, with the exception of the specific airborne concentrations as indicated by the air clearance test performed by RPF during the conditions present for the clearance testing. Unless otherwise specifically noted in the RPF Report, visual inspections and air clearance testing results apply only to the specific work area and conditions present during the testing. RPF did not perform visual inspections of surfaces not accessible in the work area due to the presence of containment barriers or other obstructions. In these instances, some contamination may be present following RPF clearance testing and such contamination may be exposed during and after removal of the containment barriers or other obstructions following RPF testing services. Client or Client's Contractor is responsible for using appropriate care and inspection to identify potential hazards and to remediate such hazards as necessary to ensure compliance and a safe environment.
10. The survey was limited to the material and/or areas as specifically designated in the report and a site assessment for other possible environmental health and safety hazards or subsurface pollution was not performed as part of the scope of this site inspection. Typically, hazardous building materials such as asbestos, lead paint, PCBs, mercury, refrigerants, hydraulic fluids and other hazardous product and materials may be present in buildings. The survey performed by RPF only addresses the specific items as indicated in the Report.
11. For mold and moisture survey services, RPF services did not include design or remediation of moisture intrusion. Some level of mold will remain at the site regardless of RPF testing and Contractor or Client cleaning efforts. RPF testing associated with mold remediation and assessments is limited and may or may not be representative of other surfaces and locations at the site. Mold growth will occur if moisture intrusion deficiencies have not been fully remedied and if the site or work areas are not maintained in a sufficiently dry state. Porous surfaces in mold contaminated areas which are not removed and disposed of will likely result in future spore release, allergen sources, or mold contamination.
12. Existing reports, drawings, and analytical results provided by the Client to RPF, as applicable, were not verified and, as such, RPF has relied upon the data provided as indicated, and has not conducted an independent evaluation of the reliability of these data.
13. Where sample analyses were conducted by an outside laboratory, RPF has relied upon the data provided, and has not conducted an independent evaluation of the reliability of this data.
14. All hazard communication and notification requirements, as required by U.S. OSHA regulation 29 CFR Part 1926, 29 CFR Part 1910, and other applicable rules and regulations, by and between the Client, general contractors, subcontractors, building occupants, employees and other affected persons were the responsibility of the Client and are not part of the RPF SOW.
15. The applicability of the observations and recommendations presented in this report to other portions of the site was not determined. Many accidents, injuries and exposures and environmental conditions are a result of individual employee/employer actions and behaviors, which will vary from day to day, and with operations being conducted. Changes to the site and work conditions that occur subsequent to the RPF inspection may result in conditions which differ from those present during the survey and presented in the findings of the report.



## TOWN CENTER UPGRADE REPORT

### IV. ASSESSMENT AND COSTS FOR UPGRADES TO THE CURRENT BUILDINGS

The Town retained Sheer McCrystal Paulsen Architecture (SMP) to complete a report entitled "Analysis of the Town of Bow Police and Fire Facilities". The report was dated March 2007. A copy of this report is located in Appendix "A" of this report. We have reviewed the report by SMP and agree with the majority of the findings. Below we have included a brief synopsis of our findings with the existing buildings, recommendations, and opinions of cost for the options to upgrade the buildings.

#### Community Building

The existing community building currently houses the fire department, recreation department and provides one service/maintenance bay for fire, police and recreation. The building also serves as the Town voting place. Attached at the back of this section are existing floor plans for the community building.

The fire department uses the northern portion of the building for functions such as apparatus bays, meeting areas, offices, bunkrooms and facilities. Due to the age of the building and increased equipment size, the existing apparatus bays no longer have space for storage and equipment. The building was never properly set-up to house full-time personnel and Bow currently has full-time personnel in the building. There should be separate male and female bunkrooms, proper male and female locker rooms, and restroom facilities for both male and female personnel. All areas such as meeting, office, and storage are inadequate to meet current needs of the department and building code. The building is not accessible in regards to the standard ADA guidelines and code.

This building has served the Town for over fifty years and in our opinion, the fire department can no longer effectively function from this building due to the large number of constraints. Also, the building is not designed to resist significant weather events such as hurricanes or seismic events.

We would not recommend upgrading the facility due to the numerous issues with the building. If the facility were to be renovated, the entire building must be upgraded to meet the current building code. The current building code is the 2009 International Building Code (IBC). The 2009 IBC considers fire and police stations to be "essential facility". The code requires an essential facility to be designed to resist extreme events such as hurricanes and seismic events. In order to resist these types of events, the entire substructure (foundation) and superstructure (steel frame) would need to be upgraded. This would be a very difficult and costly expense to upgrade a building that no longer meets the needs of the occupant. Also, the fire department would need to be relocated during the renovation work.

The recreation department is currently housed in the southern portion of the building. There is a small office and storage area on either side of the entry. There are restroom facilities that are not code compliant. Non-ADA compliant facilities may need to be



## TOWN CENTER UPGRADE REPORT

addressed if the situation is raised by someone dealing with accessibility issues. The multi-purpose room is a fairly large room with a stage, but is not large enough to host any league games. There is storage for various Town groups located above the office and storage areas in the front of the building, but this area is small and very difficult to access. There are user safety issues with the building such as no guards over the radiators in the multi-purpose room. Also as noted above, the existing mechanical and electrical systems are no longer adequate to serve the buildings needs. The mechanical system is not able to keep the building at a comfortable temperature during the cold winter months.

The recreation department could continue to make do in the existing facility, but we would recommend that the Town actively plan for and work to have a new recreation building designed and constructed in the next five to eight years. If the building were continued to be used by recreation, we would recommend an upgrade to the mechanical system and correct any safety issues, such as a guard over the radiators in the multi-purpose room. The recreation building could be the first new building in the upper portion of the property at 1 Knox Road.

Once both the fire and recreation departments have moved out of the building, we would recommend that the building be demolished. The age of the buildings again would make them difficult to renovate.

The building's mechanical and electrical systems are out of date and are in need of replacement. The mechanical system is not sufficient to provide the heat required to keep the building comfortable in the colder winter months. There is insufficient ventilation in the building as well. The wiring to a number of pieces of equipment does not meet the electrical code.

### Police and Department of Public Works (DPW) Building

The building is a pre-engineered metal building that was constructed in the mid-to-late 1980's. The police department occupies the front (south) end of the building. This portion of the building is two stories. The DPW occupies the northern end of the building. DPW has a small office area, kitchen, parts area, restroom facilities and maintenance bays. There are currently 18 bays with overhead doors. The last two bays in the building are occupied by the school district for bus maintenance.

In order to upgrade the police department facilities to meet current code, there are a few major items that need to be addressed. Those items are accessibility, sally port, booking, holding and code required structural upgrades.

If the building is to remain a police station, a number of accessibility requirements need to be addressed. One of the restrooms on each level will need to be made accessible. An elevator will need to be installed so that travel to each level of the building is possible. A second means of egress (stair tower) will need to be added so occupants of the second floor can safely leave the building in case of an emergency and access the



## TOWN CENTER UPGRADE REPORT

outside of the building directly. If an addition were undertaken for the sally port, booking, and holding areas, it would be cost effective to place the elevator and stair tower in the addition. The second means of egress would need to be added if the second floor of the building is occupied.

A sally port will need to be included in the project. Again, there are two possibilities for locating the sally port. One would be an addition; the second would be inside the existing building. Adjacent to the sally port, acceptable booking and holding areas will need to be added.

We have reviewed the existing conditions in the DPW portion of the building, and if the police were to take a bay from the DPW, it would displace the DPW's offices and parts area.

If the project is undertaken to upgrade the PD space, the structural system of the building would need to be upgraded to meet current code requirements for an essential facility. As with the fire department, the code requires an essential facility to be designed to resist extreme events such as hurricanes and seismic events. In order to resist these types of events, the entire substructure (foundation) and superstructure (steel frame) would need to be upgraded. This would be a very difficult and costly expense to upgrade this building. The building does not work well for the police department and spending this money to upgrade the building would be difficult to justify. Also, the police department would need to be relocated during the renovation work.

Construction of the structural upgrade of the police department space would require removal of most, if not all, interior finishes.

Attached at the back of this section are existing floor plans for the police department portion of the building.

The DPW portion of the building currently works quite well for the department. The offices are functional, the maintenance bays allow most, if not all, the equipment to be kept under protective cover that is very important and extends the life of the equipment. The maintenance bays are served by an overhead crane which makes maintaining the equipment much easier. Since the building is 20+ years old and was originally constructed for a different use, there are some areas of the building that need to be upgraded. The mechanical and electrical systems should have some updating, and the floor plan could be reworked to make the space more useable for the DPW staff. A number of the upgrades would include installing more energy efficient equipment that would reduce the costs to operate the building. The police and DPW share the electrical system but have different mechanical systems. The systems could be upgraded as the spaces are renovated.

Regardless of whether or not the police department continues to occupy the building, the existing masonry walls and the moisture intrusion must be addressed. We recommend a new exterior "skin" be installed over the masonry. 2" of rigid insulation would be



## TOWN CENTER UPGRADE REPORT

installed directly to the masonry, a spray on membrane would be installed, vertical spacers would allow an air space between the siding and the insulation, and then the new siding would be attached to the vertical spacers. A good choice for the siding is a cement board siding. The cement board siding is durable, cost effective, aesthetically pleasing, and the coatings will minimize future maintenance. We would recommend that all the doors and windows in this area be removed and replaced with new energy efficient units.

If the police department were to move out of this building, the interior of the building could be renovated to accommodate another Town department, or if the Town chooses, it could be used as rental space.



## TOWN CENTER UPGRADE REPORT

### Community Building Options

- Minor renovation if the Fire Department moves to a new building and recreation continues to use the existing building. Renovation would include minor updates to the mechanical and electrical systems, but no significant changes to the building.

#### **Estimated Cost**

Building Renovation .....	\$ 200,250
Soft Costs (A&E, FFE, etc. @ 10%) .....	\$ 20,025
<b>TOTAL</b> .....	<b>\$ 220,275*</b>

- Major renovation if the Fire Department is to continue to use the building: Increase the height of the building, but not the footprint, and address all code and functional issues within the building.

#### **Estimated Cost**

Building Renovation .....	\$ 3,430,250
Site Costs.....	\$ 10,000
Soft Costs (A&E, FFE, etc. @ 25%) .....	\$ 860,062
<b>TOTAL</b> .....	<b>\$ 4,300,312*</b>

### PD/DPW Building Options

- Minor Renovation: Provide a new skin over the masonry section of the building. Also replace all the doors and windows in the area with masonry exterior walls.

#### **Estimated Cost**

Building Renovation .....	\$ 130,000
Soft Costs (A&E, etc. @ 10%).....	\$ 13,000
<b>TOTAL</b> .....	<b>\$ 143,000*</b>

- Office Only Renovation: Assuming the PD moves to a new facility, the existing PD space can be renovated into office space. The renovation would include new partition walls, new ceilings, new HVAC system and upgraded bathrooms. An elevator or lift would be recommended to be included in the project. It would be our recommendation to update the DPW finish spaces, electrical and mechanical systems.

#### **Estimated Cost**

Building Renovation .....	\$ 342,800
New Exterior Skin.....	\$ 130,000
Soft Costs (A&E, etc. @ 10%).....	\$ 47,280
<b>TOTAL</b> .....	<b>\$ 520,080*</b>
Elevator (Add) .....	\$ 150,000



## TOWN CENTER UPGRADE REPORT

- Major Renovation: Complete renovation of the existing PD space to address all the functional needs as well as address all the code issues.

Building Renovation .....	\$ 1,120,000
New Exterior Skin.....	\$ 130,000
Elevator.....	\$ 150,000
Soft Costs (A&E, FFE, etc. @ 20%) .....	\$ 140,000
<b>TOTAL.....</b>	<b>\$ 1,540,000*</b>

**\*It is recommended that a 10% project contingency be carried at this point in the project. The 10% is not included in the costs shown.**



## TOWN CENTER UPGRADE REPORT

### V. OVERVIEW AND COSTS OF NEW FACILITIES

#### PHASE I

In 2009, the Town retained SMP to complete the conceptual design and provided an opinion of construction cost for a new public safety building on the property at 1 Knox Road. A copy of the 2009 report is included in Appendix "B" of this report. The result of SMP's work was a 30,000 square foot (sq. ft.), one-story building located at the back (northeast) portion of the property.

After completing the evaluation of the existing facility and operating conditions for the fire department, the police department, and the emergency operations department it is our recommendation that a combined public safety building be constructed that will house all three operations. One benefit of housing all three departments in one building is the ability to share spaces such as meeting rooms, exercise, and training rooms and facilities. The proposed building has 6,100 square feet (sq. ft.) of shared space.

TTG used the SMP space program and plan as a starting point in meeting with police, fire, and emergency operations. We revised the plan into what is shown on conceptual design Option "A" dated September 9, 2011. In addition, we created Option "B" which is a slightly smaller footprint with a small second floor, and Option "C" which is a two-story building with a full basement for fire, police, and emergency operation functions and a one-story apparatus bay. Each of the options has approximately 30,000 sq. ft. of useable space, but smaller footprints.

The option of constructing a building to house just the fire department and emergency operations and a separate building that would house the police station was considered. A building housing only the fire department and emergency operations would need to be approximately 20,000 sq. ft. A building housing the police department would be approximately 15,000 sq. ft. Opinions of cost for each of the new facility options are at the back of this section of the report.

In reviewing the location of the building on the site, it was determined that the best location for the combined public safety building was on the front (southwest) corner of the lot close to the intersection of Logging Hill, Bow Center, and Knox Road. The reasons for locating the building in this area included concern for the public and safety vehicles using the long driveway at the same time and overall best use for the property. The desire for the property included not only a new safety building but a new Town Center in the future. Locating the building in the back of the property would significantly limit the ability to locate a new Town Center on the property.

A building with a 30,000 sq. ft. footprint would not fit on the lot in the desired location. Based on the desired location on the site, optimizing the usage of the building within the footprint and overall construction and operational costs, Option "C" was determined to be the most desirable. Since it has the smallest footprint at 18,000 sq. ft., it fits in the front of the site. The plan allows for expansion to each of the office (police and fire) ends of



## TOWN CENTER UPGRADE REPORT

the building, as well as the apparatus bay. The smaller footprint will allow for a full basement and second floor and reduces the overall exterior wall. Reduction in the overall exterior wall will allow for reduced operating costs. The conceptual plans for the public safety building is shown on the plan dated September 21, 2011 and are included in the back of this section.

The construction of a new public safety building addresses the most pressing need to address for the Town. The new public safety building would also be considered the beginning of a Town Center. The property at 1 Knox Road is approximately 17 acres. The construction of a new safety building will utilize approximately 3.2 acres. The area proposed for the future Town Center will utilize approximately eight acres leaving approximately five acres for green space or future development of the Town Center. The conceptual site plan for the safety building is shown on the sketch entitled "Draft of Phase 1 of Bow Center Master Plan" dated October 12, 2011.

When locating the new building on the site, consideration was given to the future of the Logging Hill, Bow Center, and Knox Road intersection upgrades. The building was sited to allow for the construction of what would take the most land to construct, a roundabout. Whether a new signalized intersection, roundabout, or other intersection upgrades are constructed, the location of the building will not interfere with the proposed work.

### PHASE II - Town Center

By locating the public safety building close to Logging Hill, Bow Center, and the Knox Road intersection, it allows the back (east) portion of the property to be utilized for a new Town Center. The new Town Center could be constructed in multiple phases. We have proposed adding a new access drive that would be located off Knox Road across the road from the gravel parking area next to the rescue building (a separated entrance roadway that would allow signage and other means of distinguishing this entry as to access an important place).

The first building proposed in the new Town Center project would be a building for parks and recreation, a multi-generational community center. This would be the second phase of the new Town Center construction. The building would be located on the west side of the main access road. In addition to the building, a parking area and playing field would be recommended to be added. The building would include a full size gymnasium, office space, meeting space, classrooms and activity areas. We would recommend a storage/maintenance building be constructed at the Hanson Park complex off Albin Road. It is not recommended that the new multi-generational community center building be used to store and maintain the tractors and equipment required for fields. The maintenance building would significantly reduce the time and travel of the equipment to the fields. The conceptual site plan for the multi-generational community center building is shown on the sketch entitled "Draft of Phase 2 of Bow Center Master Plan" dated October 12, 2011.



## TOWN CENTER UPGRADE REPORT

As part of Phase 2 of the project, we would recommend that the existing community building be demolished and the land adjacent to the pond be turned into a park. The age of the buildings again would make them difficult to renovate and the recommendation of this report for the long-term plan of the Town is to utilize this lot as a park.

### PHASE III

Phase 3 of the Town Center project is proposing that the entry drive extend north into the property and open into an area that has a large green space surrounded by a round drive and parking. Around the round drive would be opportunities for a free standing building such as a new Town Hall, and a small restaurant/coffee shop that would be a gathering spot. Phase 3 proposes to utilize approximately 8 acres of the property. Combining phases 2 and 3, the total area proposed to be utilized is approximately 11.2 acres which would leave approximately 4.7 acres on the back (northeast) side of the property for green space of future town center development.

The conceptual site plan is shown on the sketch entitled "Draft of Phase 3 of Bow Center Master Plan" dated October 12, 2011.



## TOWN CENTER UPGRADE REPORT

### New Building Options

- New Combined Safety Complex:

Building Construction Costs .....	\$ 4,496,250
Site Costs .....	\$ 400,000
Soft Costs (A&E, FFE, etc. @ 20%) .....	\$ 979,250
<b>TOTAL.....</b>	<b>\$ 5,875,500*</b>

- New Fire Only Building:

Building Construction Costs .....	\$ 2,896,375
Site Costs.....	\$ 400,000
Soft Costs (A&E, FFE, etc. @ 20%) .....	\$ 659,275
<b>TOTAL.....</b>	<b>\$ 3,955,650*</b>

- New Police Only Building:

Building Construction Costs .....	\$ 2,620,625
Site Costs.....	\$ 200,000
Soft Costs (A&E, FFE, etc. @ 20%) .....	\$ 564,125
<b>TOTAL.....</b>	<b>\$ 3,384,750*</b>

**\*It is recommended that a 10% project contingency be carried at this point in the project. The 10% is not included in the costs shown.**

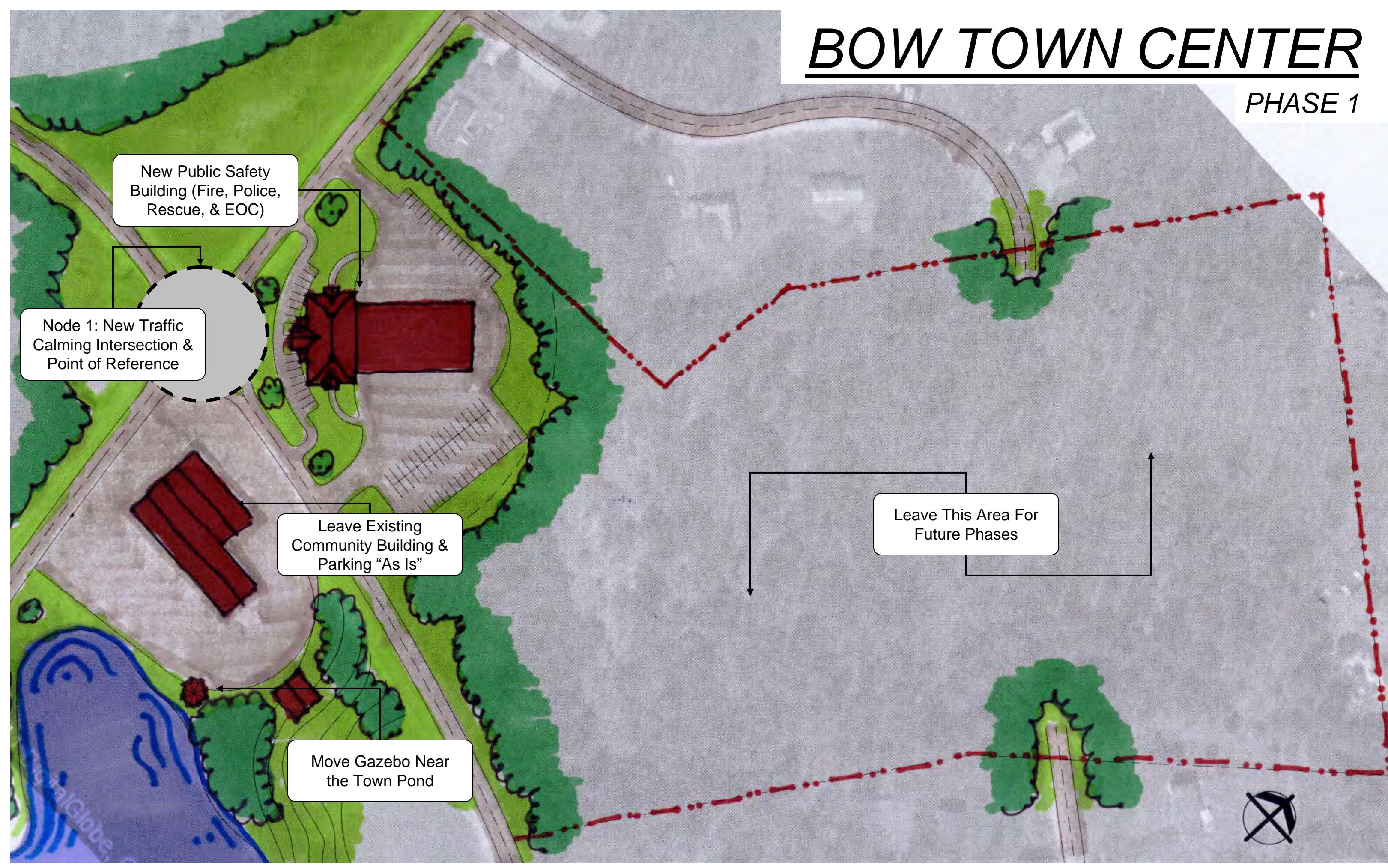
### Town Center Construction Costs (Phase 2)

Construction of 550 linear feet of new roadway & utilities....	\$ 110,000
Construction of 80 car parking lot.....	\$ 112,000
New multi-generational community center (26,000 sq. ft.) ...	\$ 3,120,600
Demolition of community building, removal of majority of the pavement, and adding green space to existing lot .....	\$ 275,000
Soft Costs (A & E, FFE, etc. @ 25%) .....	\$ 904,400
<b>TOTAL.....</b>	<b>\$ 4,522,000*</b>

## Final Project Graphics

# BOW TOWN CENTER

PHASE 1



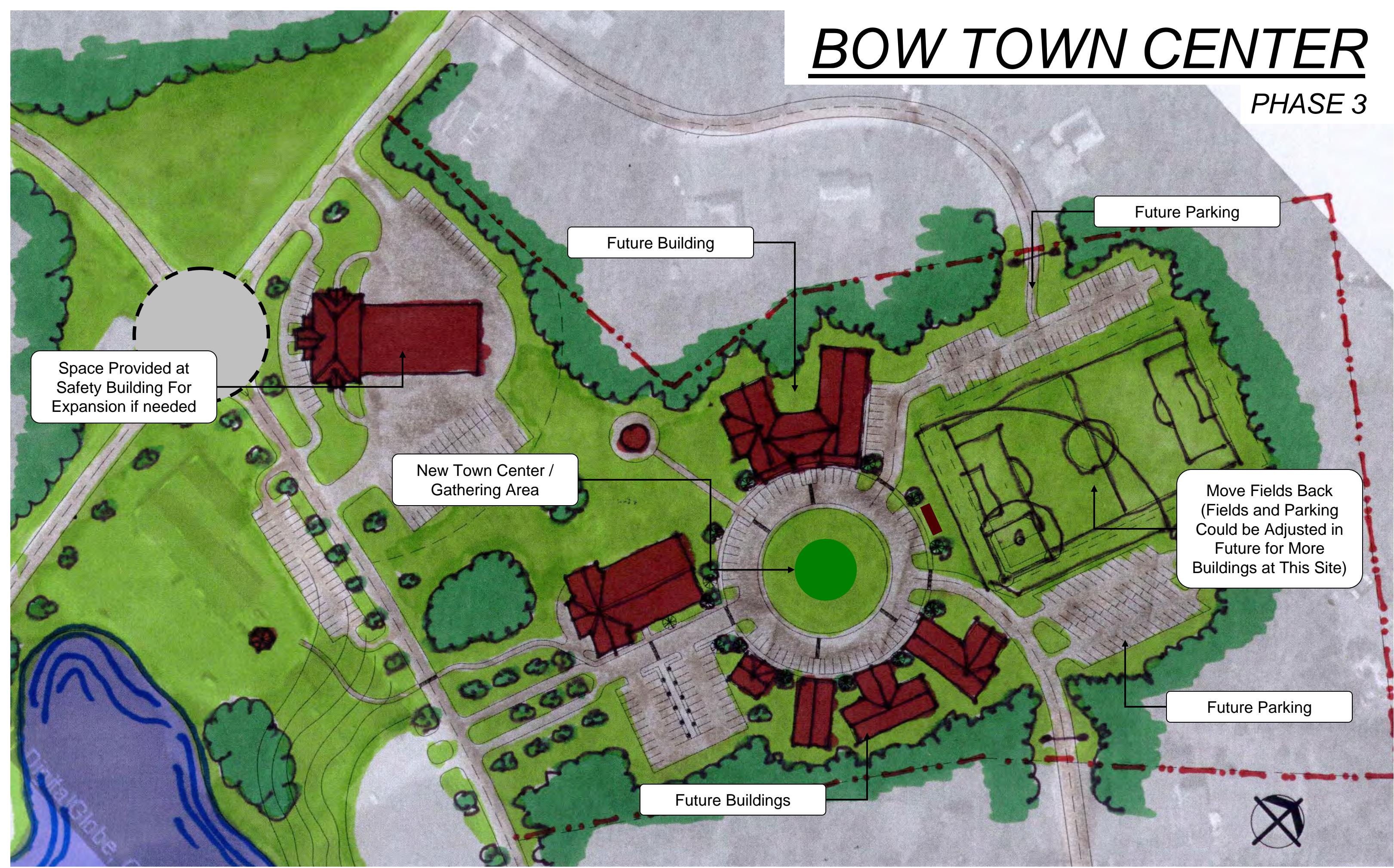
# BOW TOWN CENTER

PHASE 2

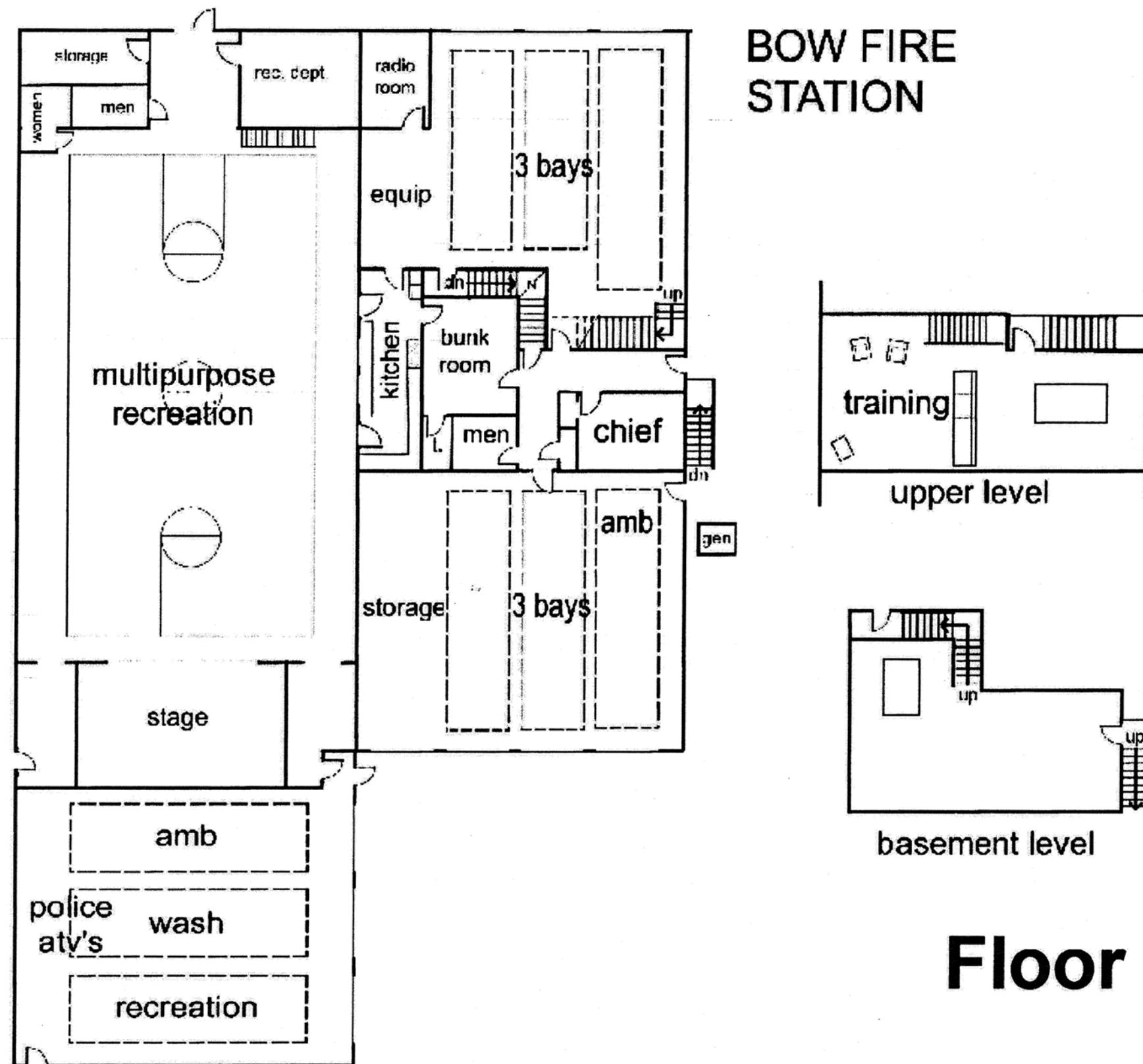


# BOW TOWN CENTER

PHASE 3



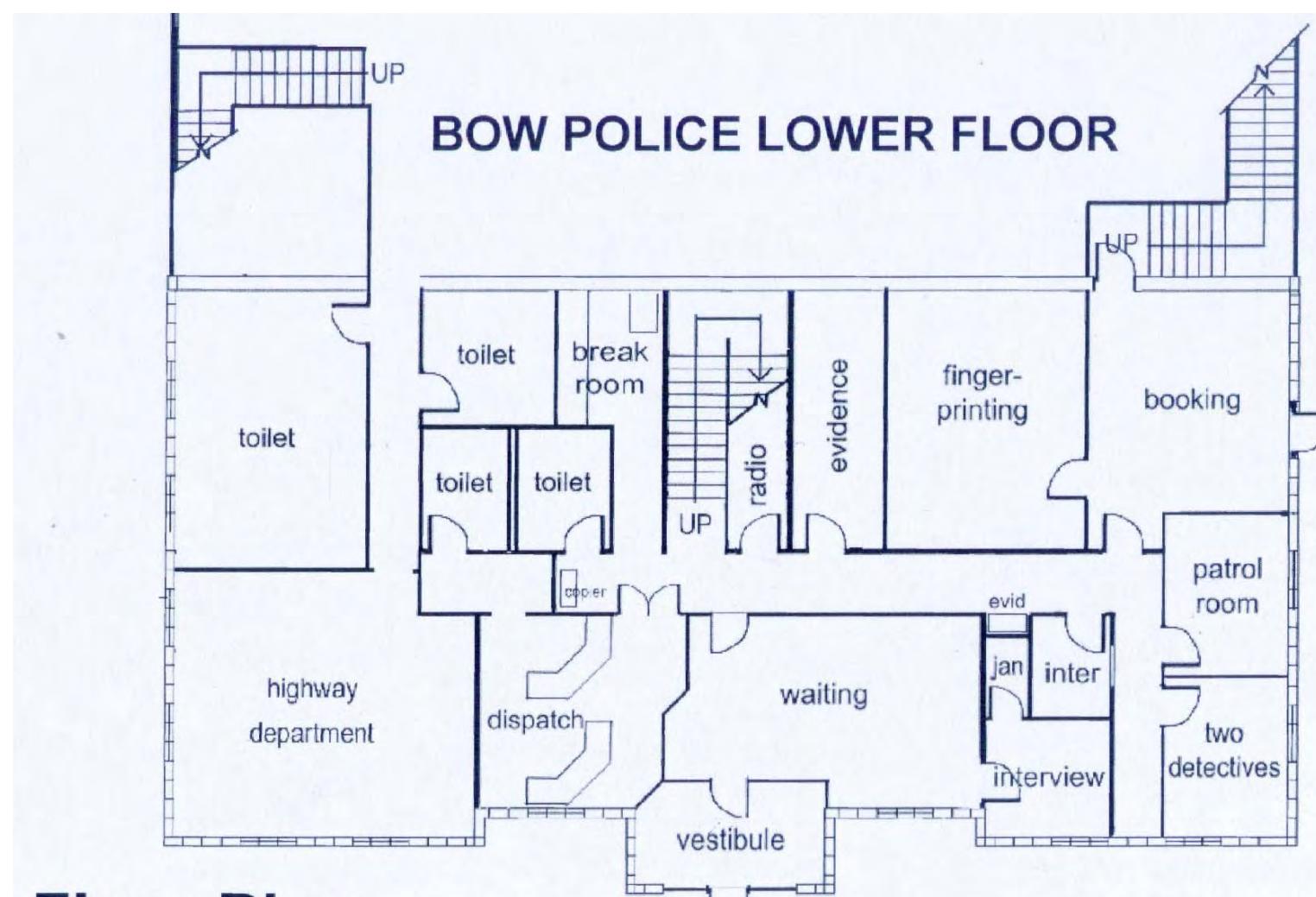
## Project Development Graphics



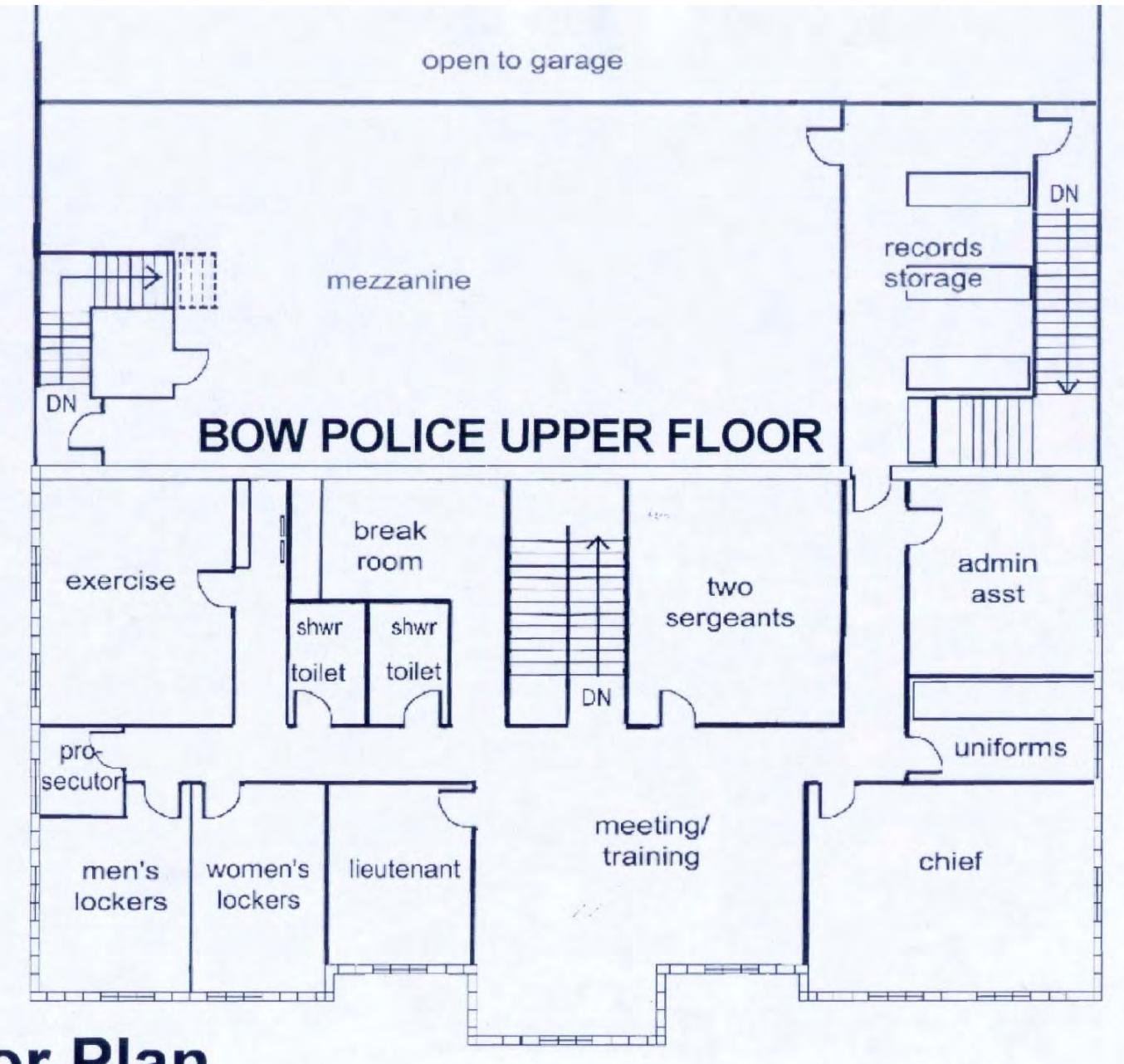
## EXISTING FIRE & COMMUNITY BUILDING

Bow Town Center and Public Safety Facility Study

Prepared By: The H.L. Turner Group Inc. ■ 27 Locke Road Concord, NH 03301 ■ 603.228.1122 ■ [www.hlturner.com](http://www.hlturner.com)



**Floor Plan**



**Floor Plan**

## EXISTING POLICE STATION

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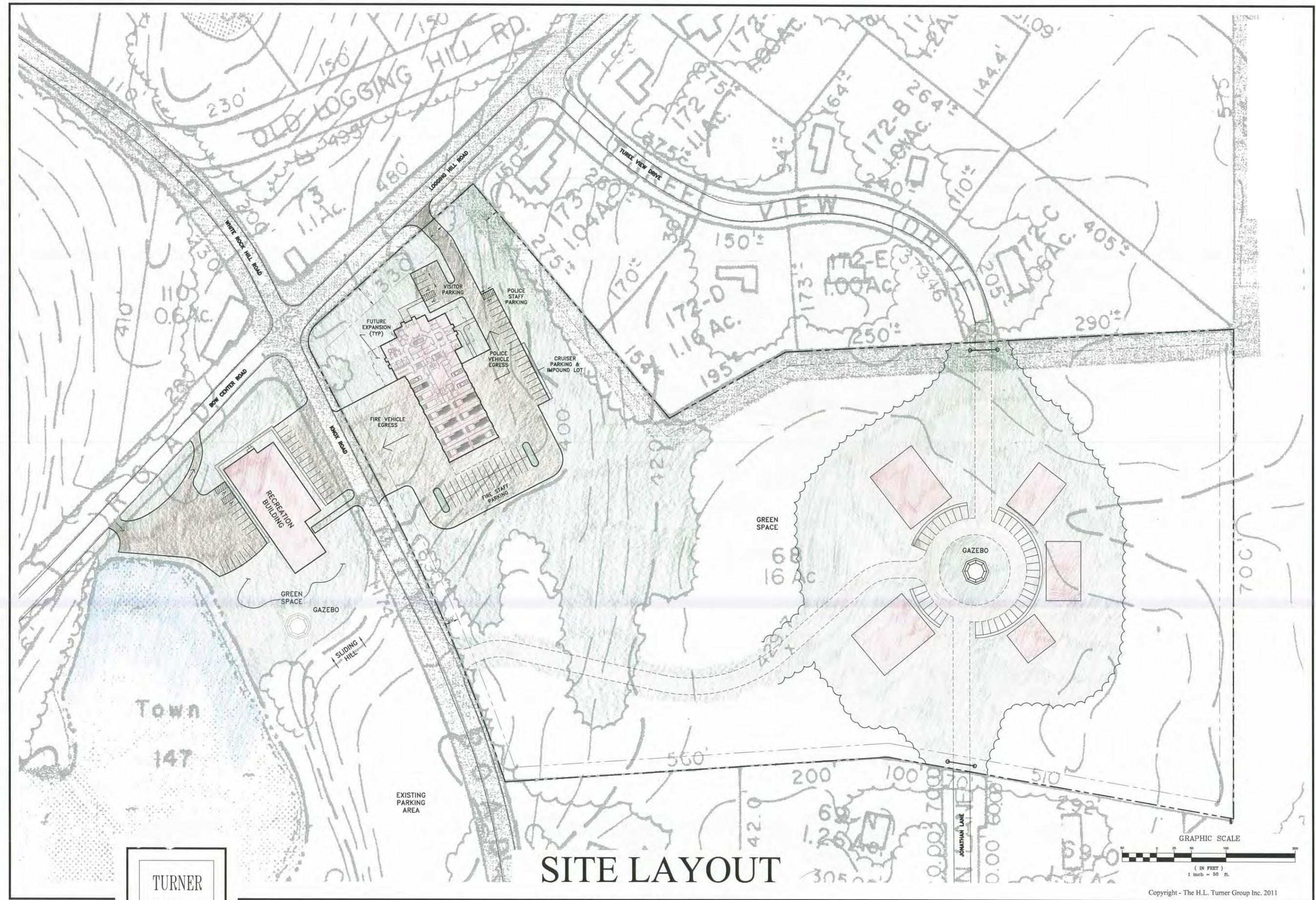


Bow Town Center Development  
Option No. 1  
September 20, 2011

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## SITE LAYOUT

## Bow Town Center Development Option No. 3 September 20, 2011

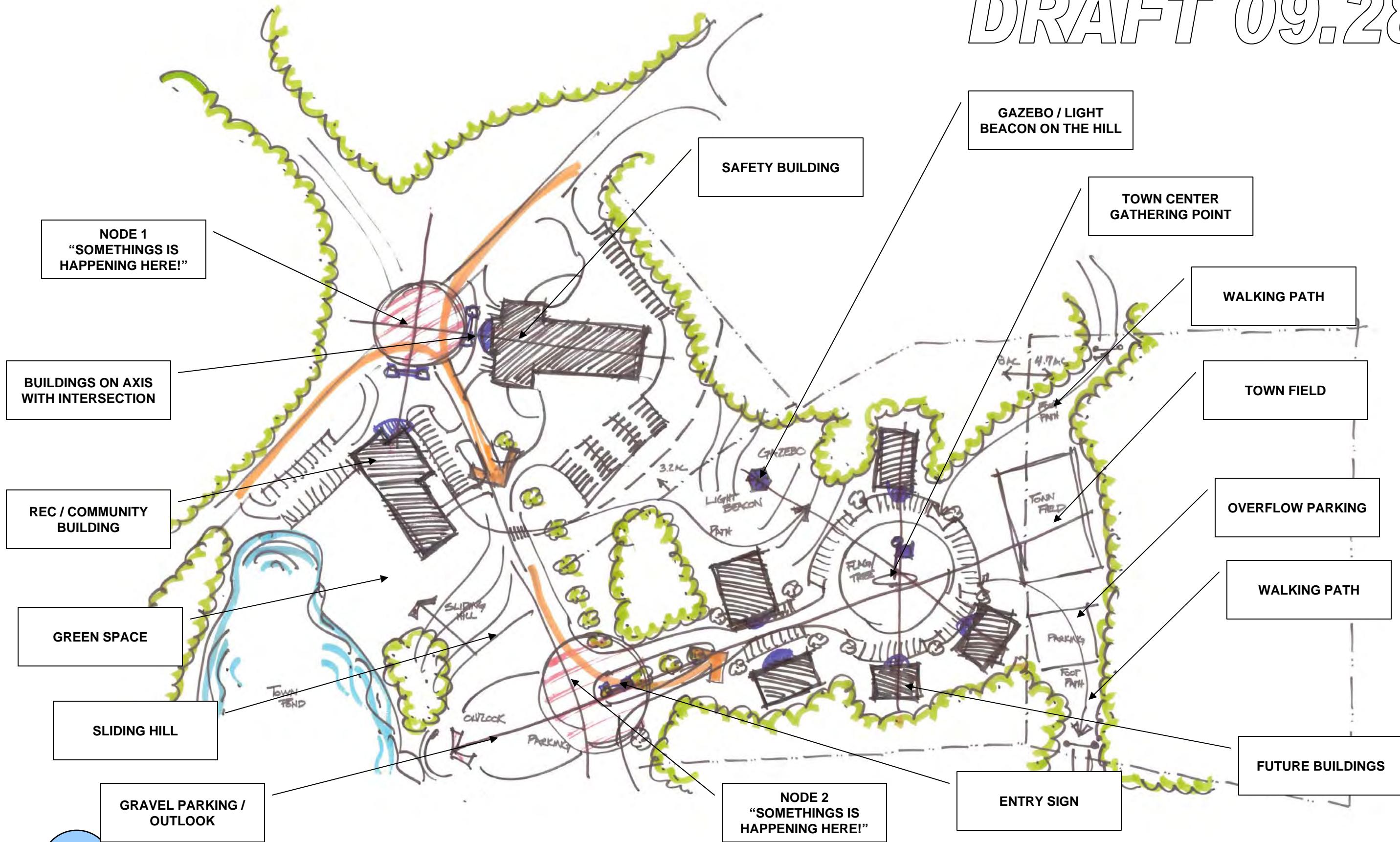
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# DRAFT 09.28.11



1

DRAFT 10.12.11

IMPROVED  
INTERSECTION

NEW SAFETY  
BUILDING PHASE 1

EXISTING COMMUNITY  
BUILDING TO REMAIN  
DURING PHASE 1

ALL PAVING &  
PARKING TO REMAIN  
DURING PHASE 1

RELOCATE GAZEBO  
TO THIS LOCATION

EXISTING RESCUE  
BUILDING TO REMAIN  
DURING PHASE 1

4-1



## DRAFT OF PHASE 1 OF BOW CENTER MASTER PLAN

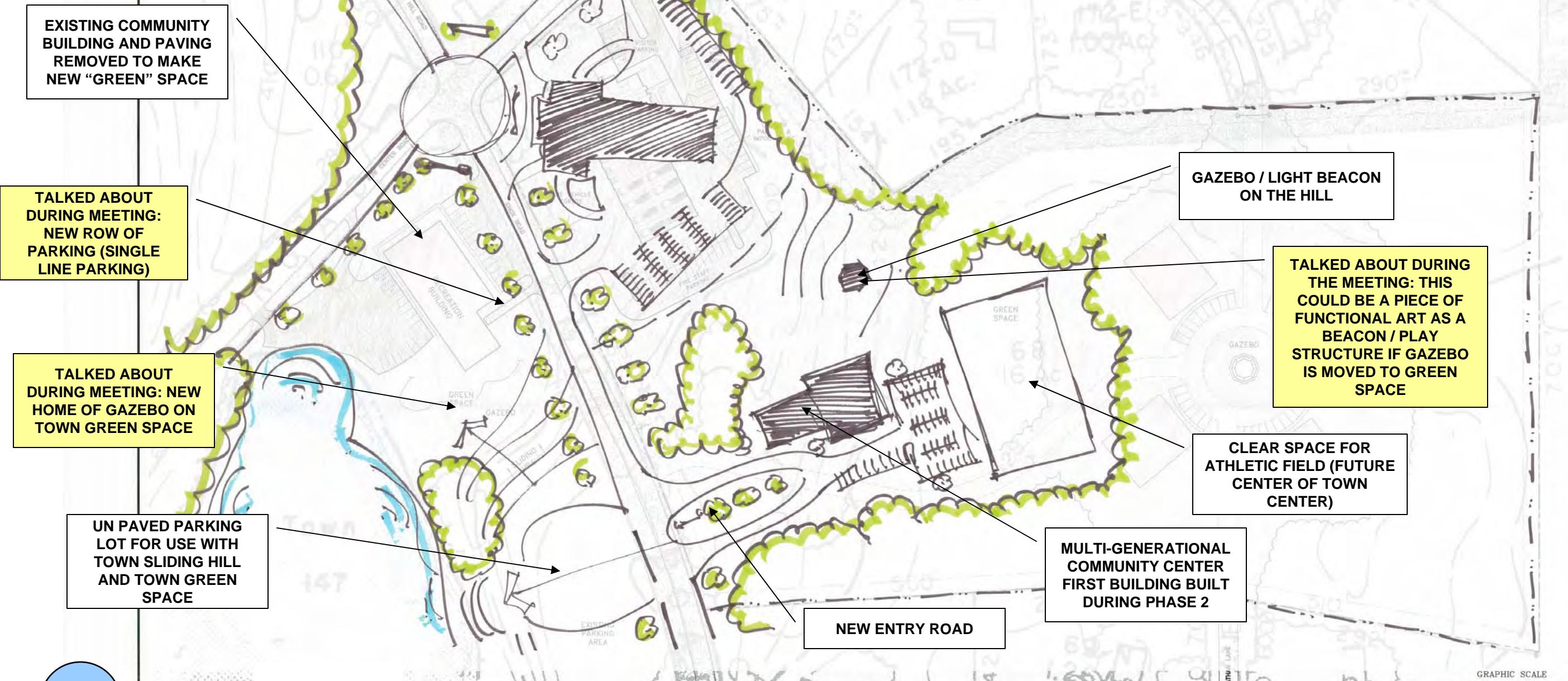
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2

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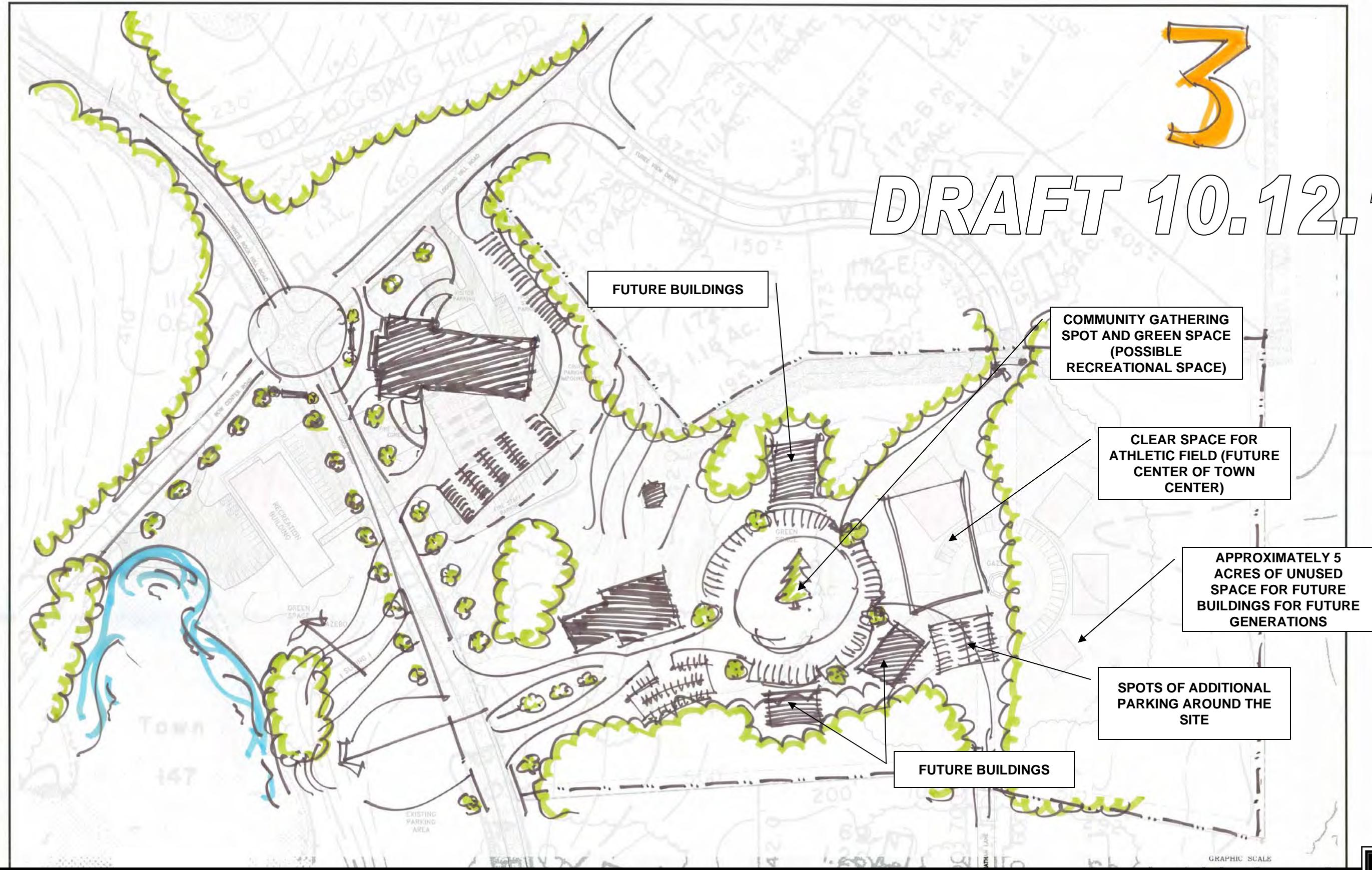


## DRAFT OF PHASE 2 OF BOW CENTER MASTER PLAN

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4-3

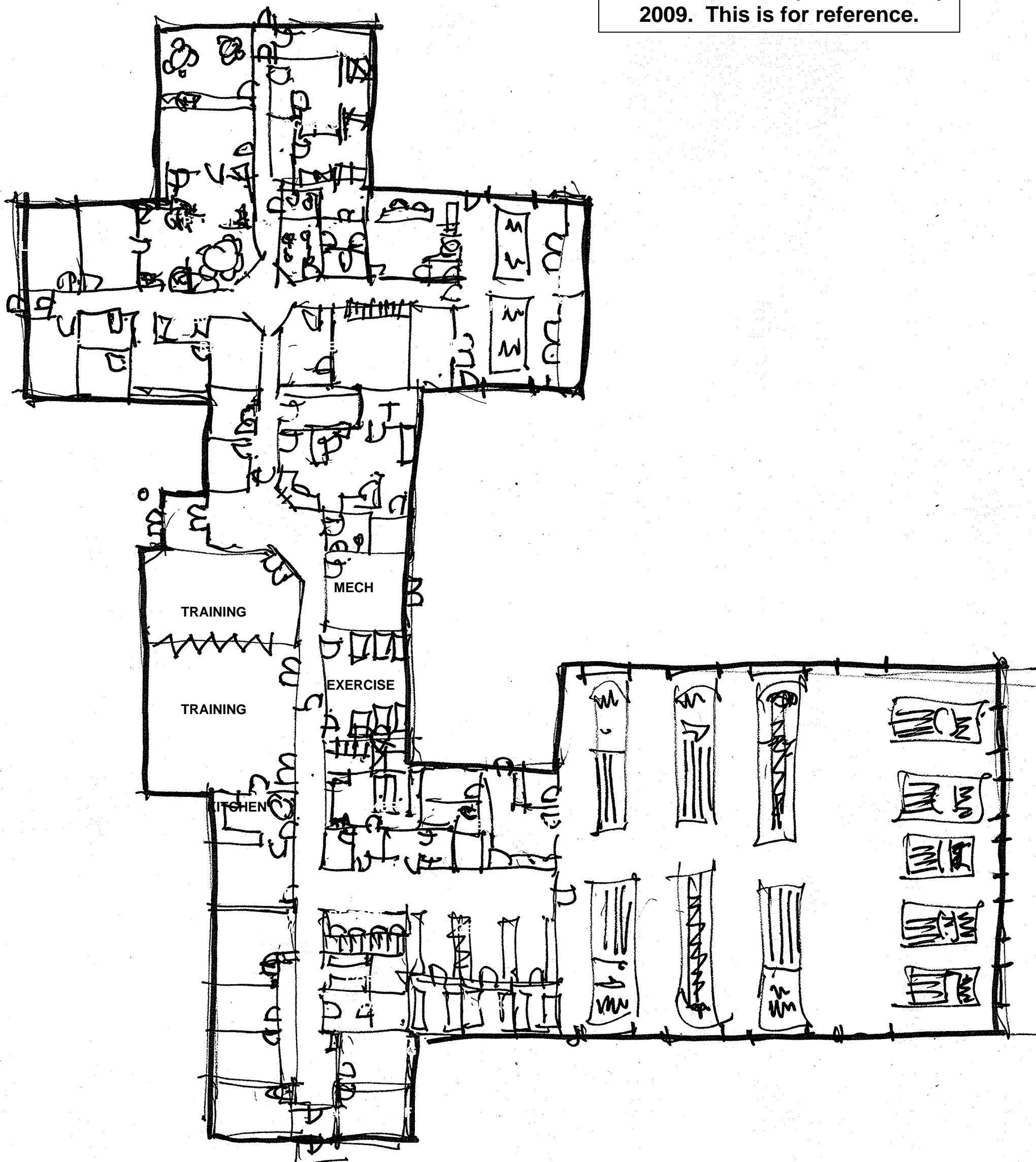
## DRAFT OF PHASE 3 OF BOW CENTER MASTER PLAN

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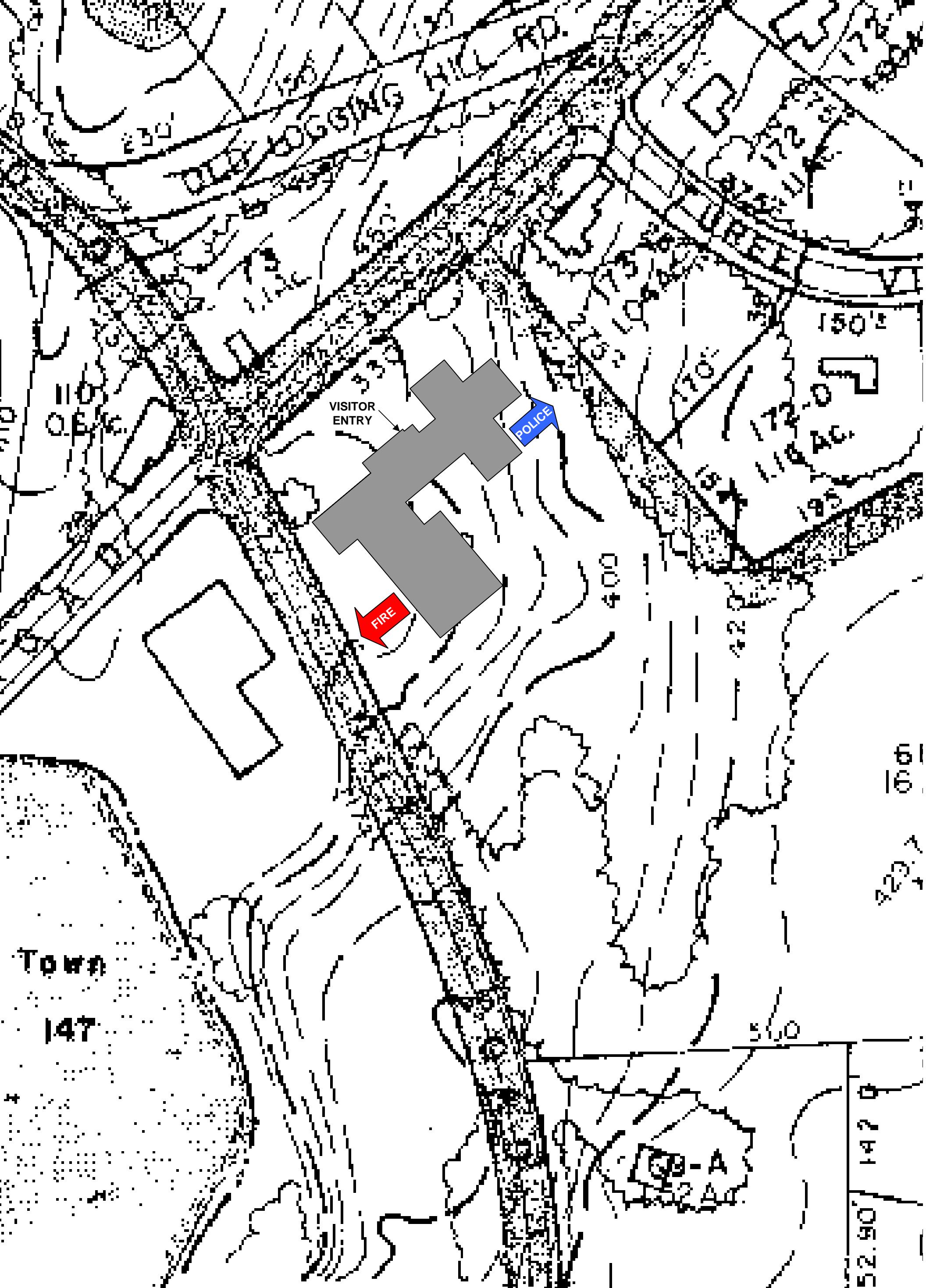
This is a modification from the  
SMP Plans developed in January  
2009. This is for reference.



A

## CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

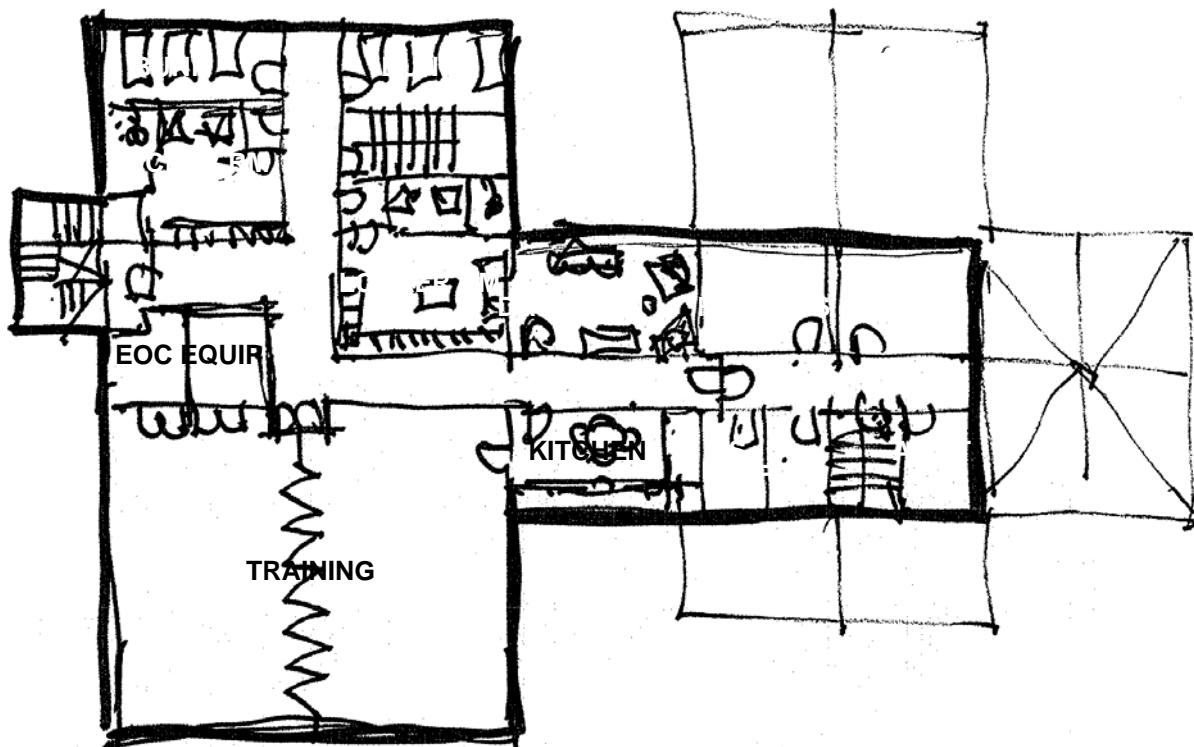


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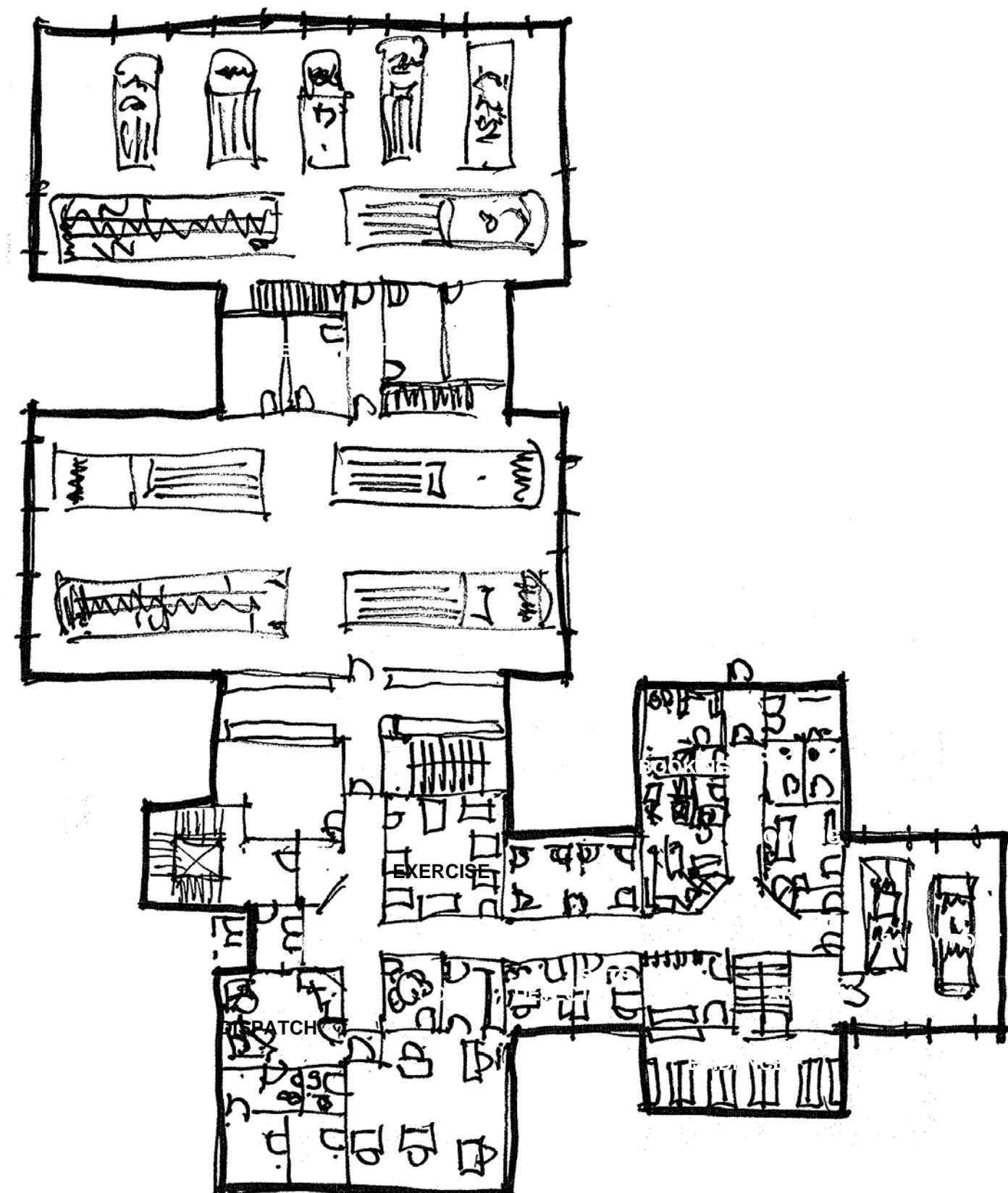
# CONCEPTUAL DESIGN OPTIONS

# Bow Town Center and Public Safety Facility Study

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## Upper Level



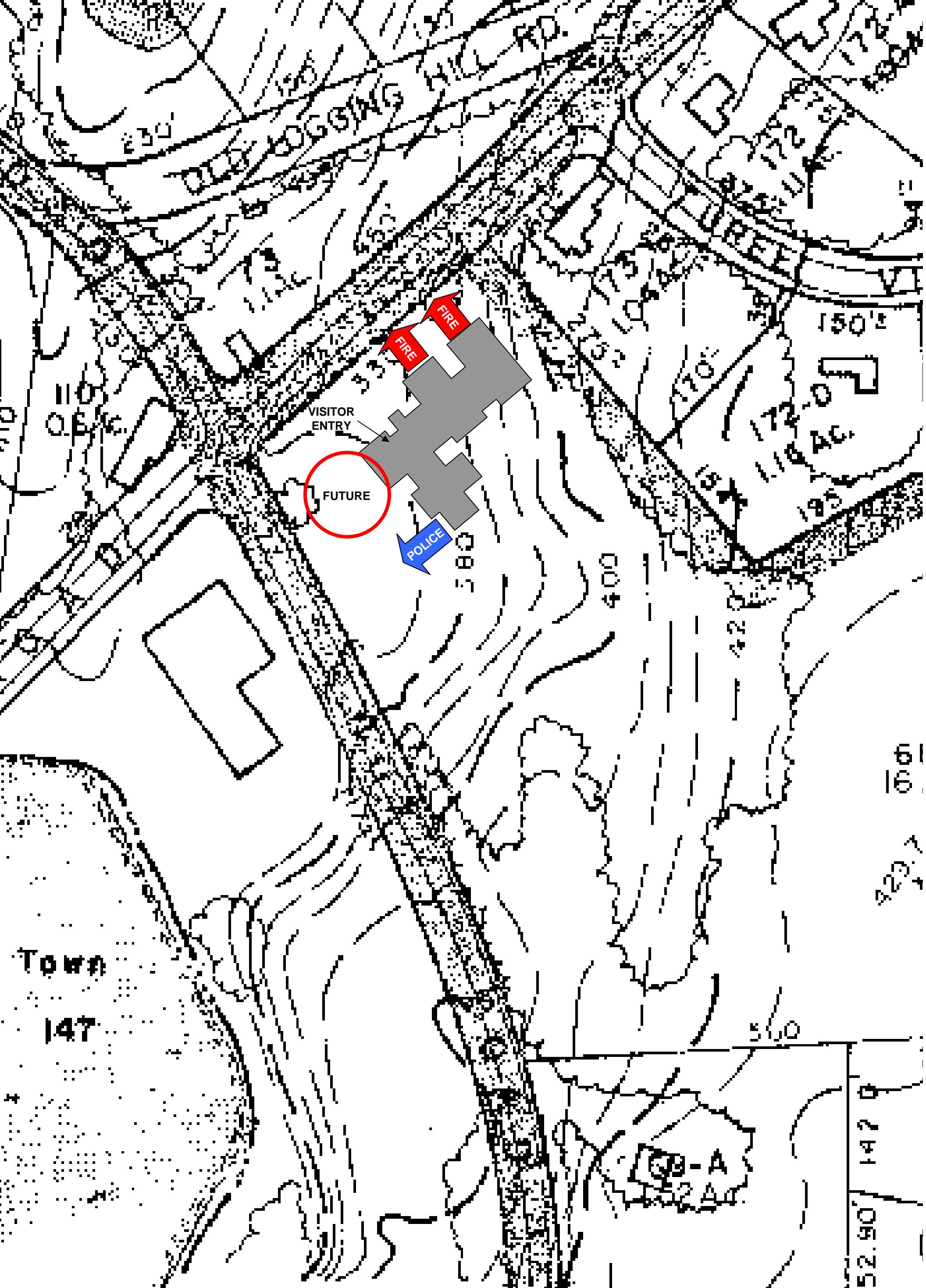
## Main Level

B

# CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

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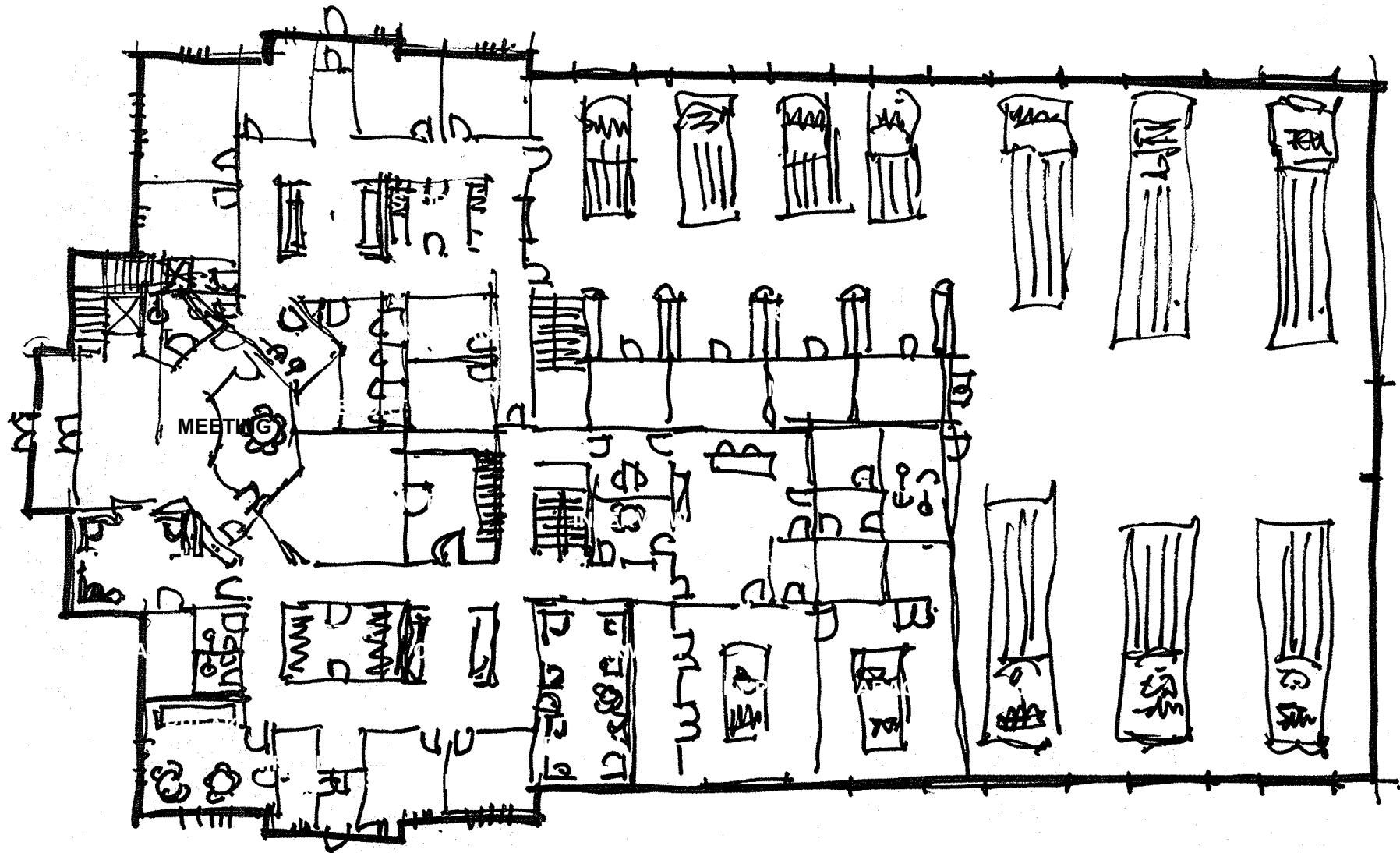


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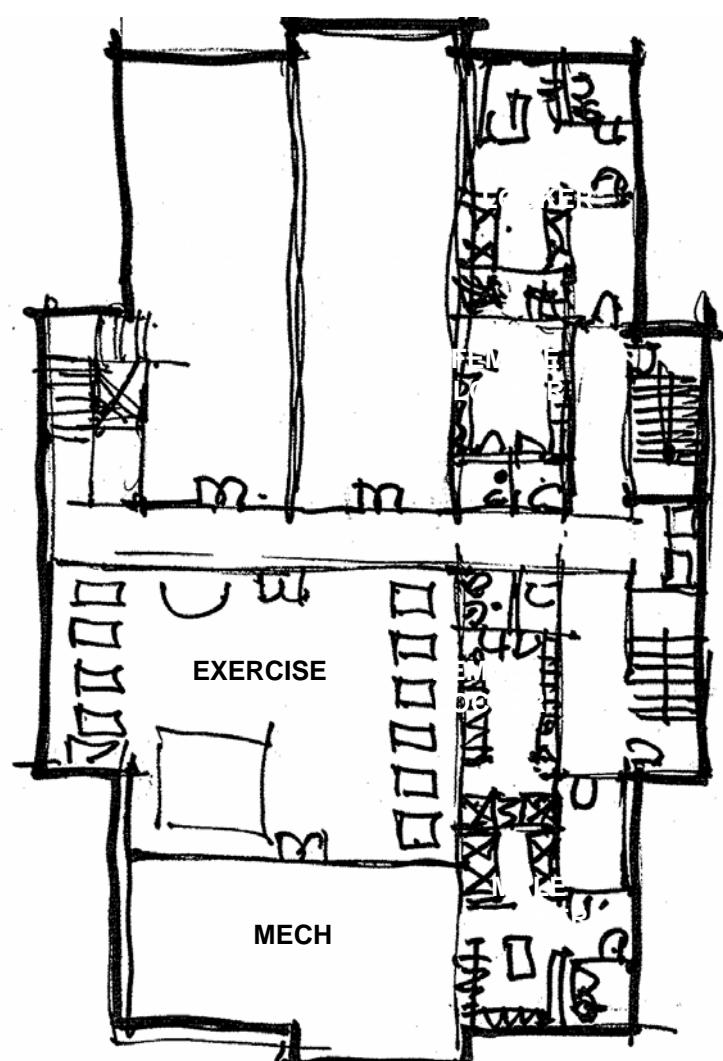
## CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

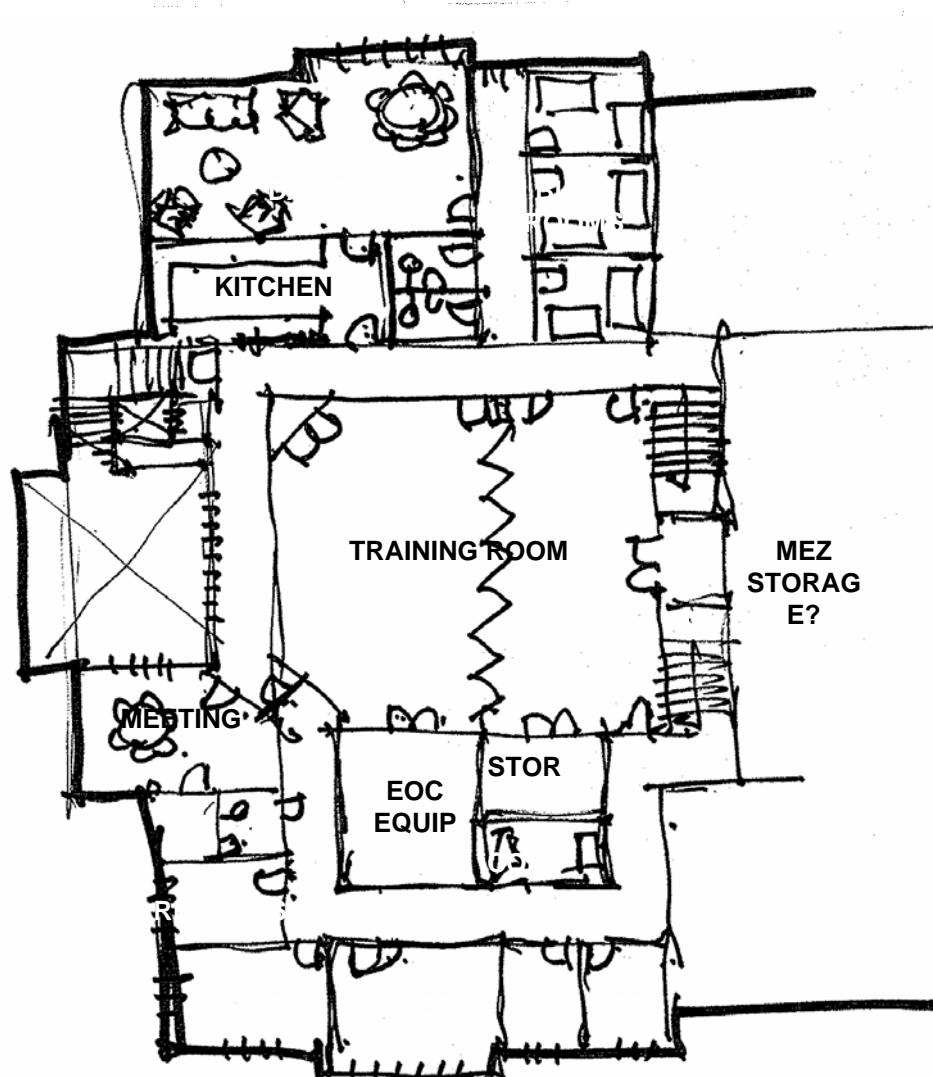
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**Main Level**



**Basement**

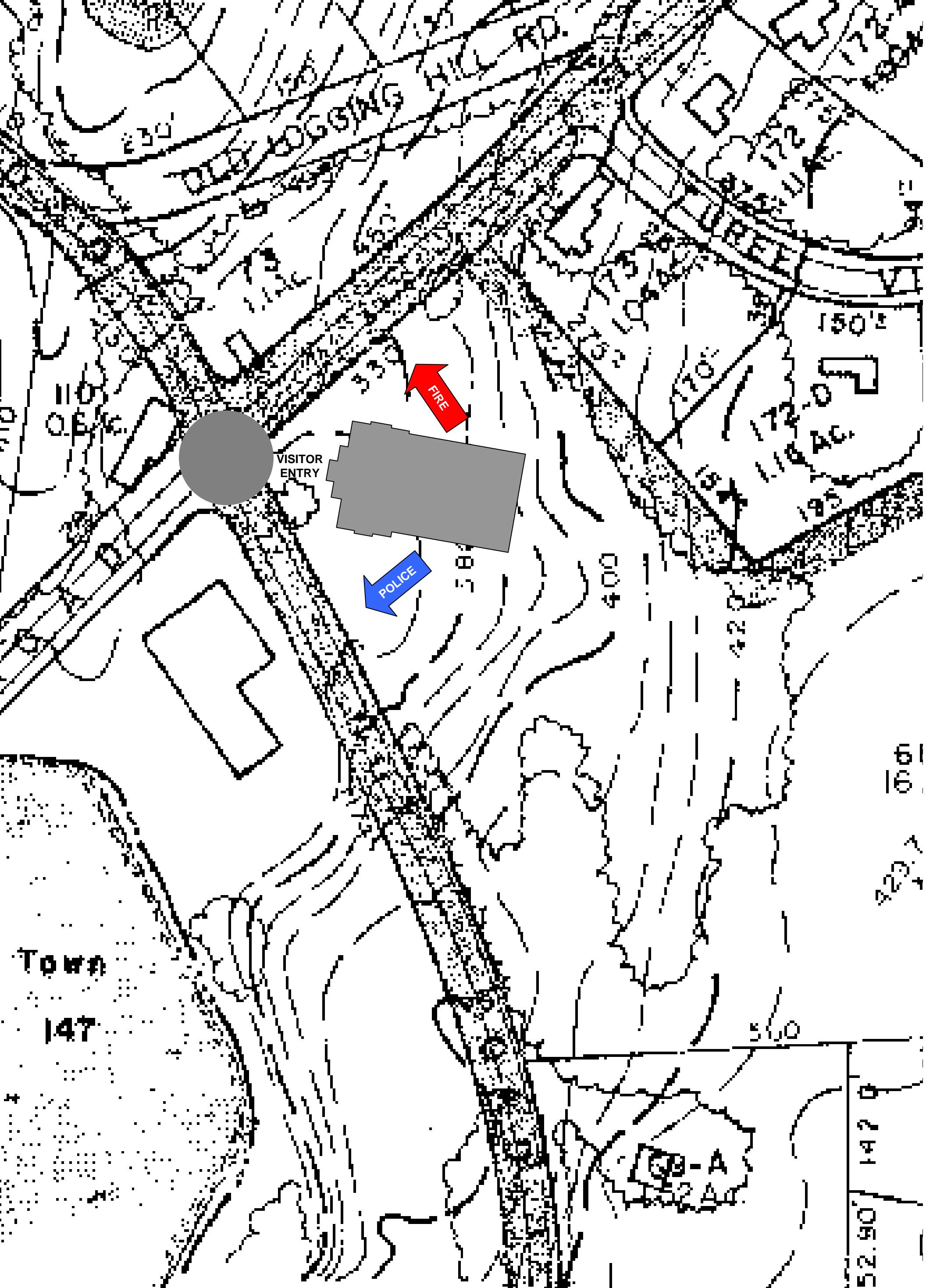


**Upper Level**

C

## CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

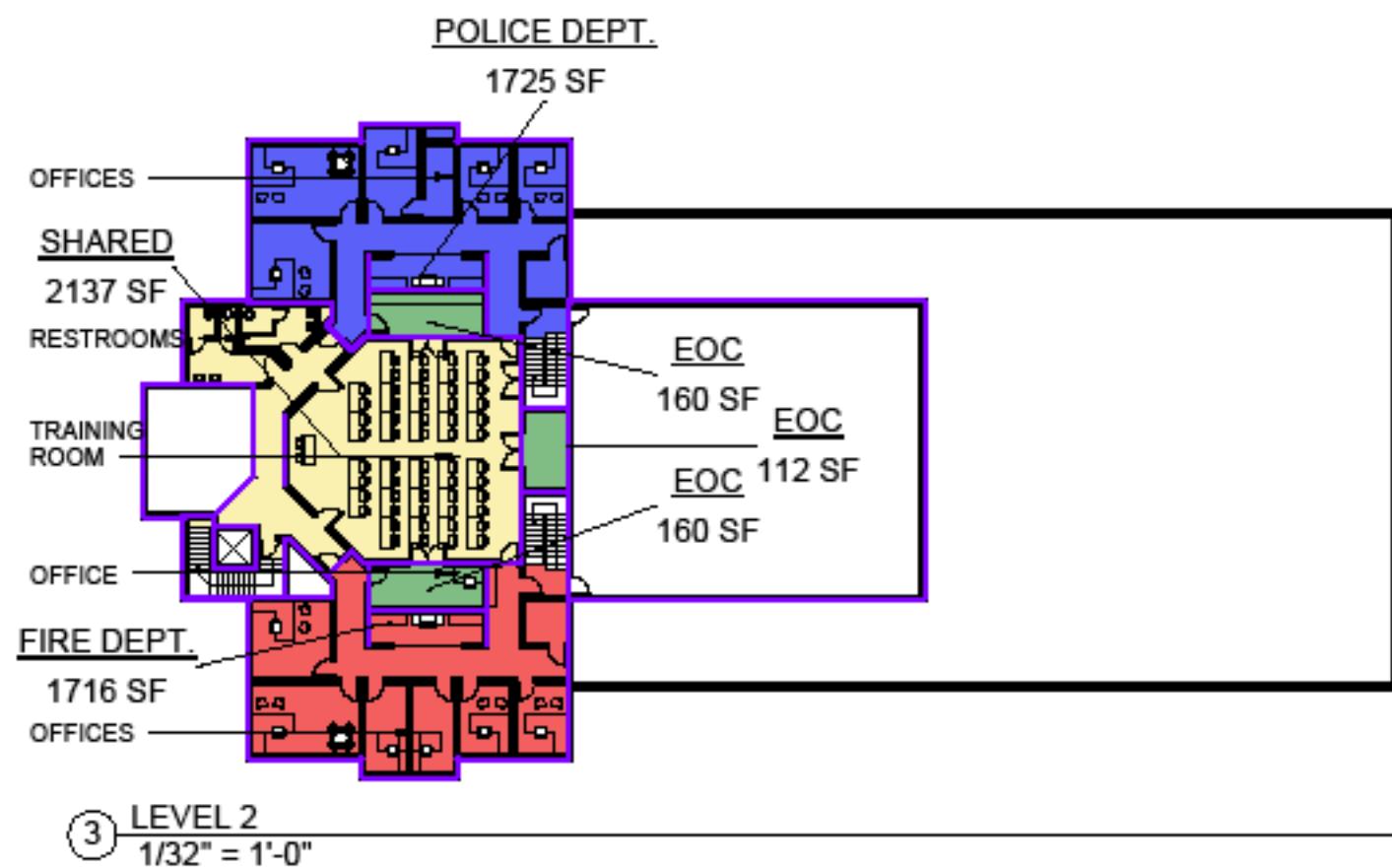


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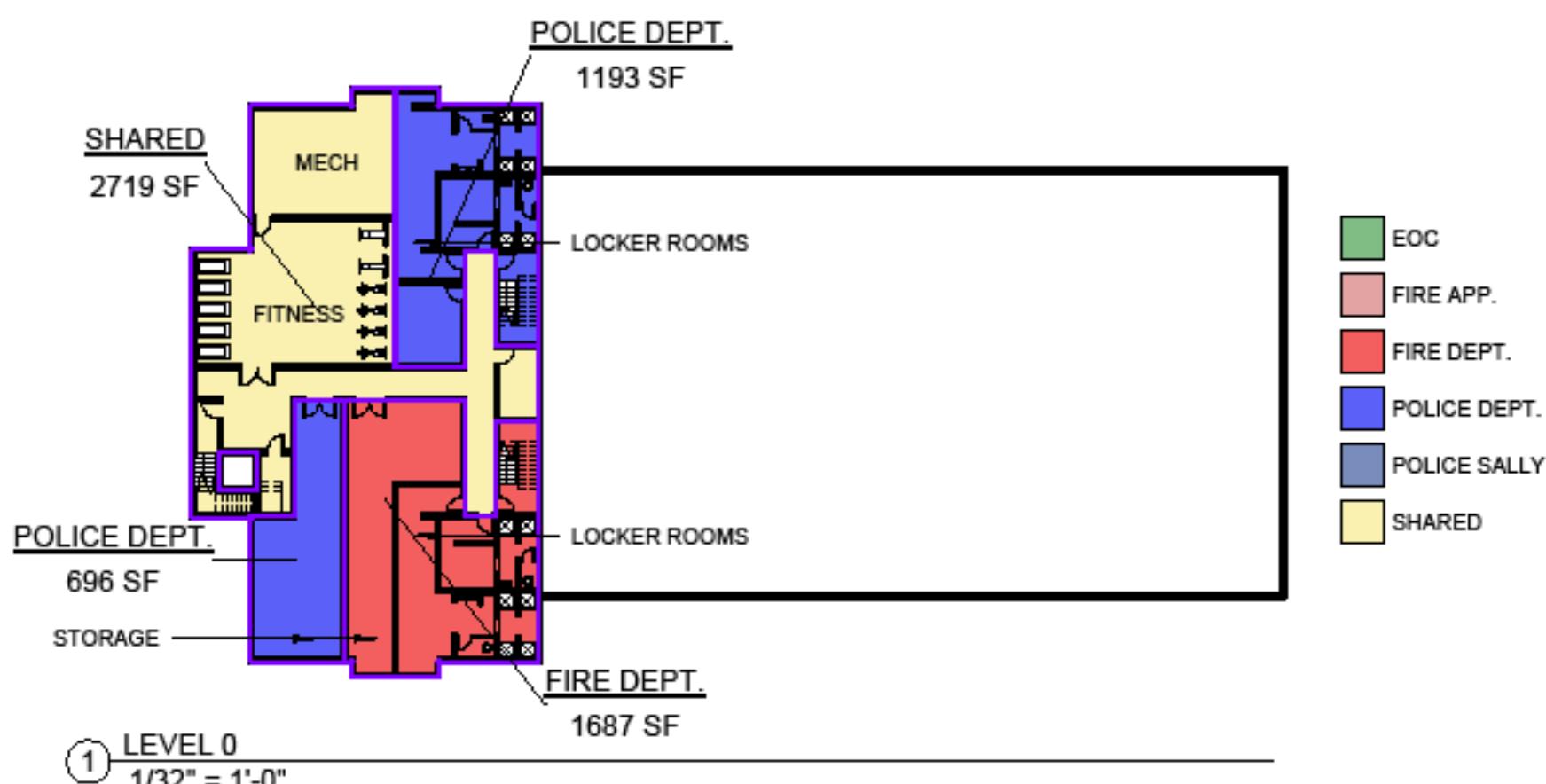
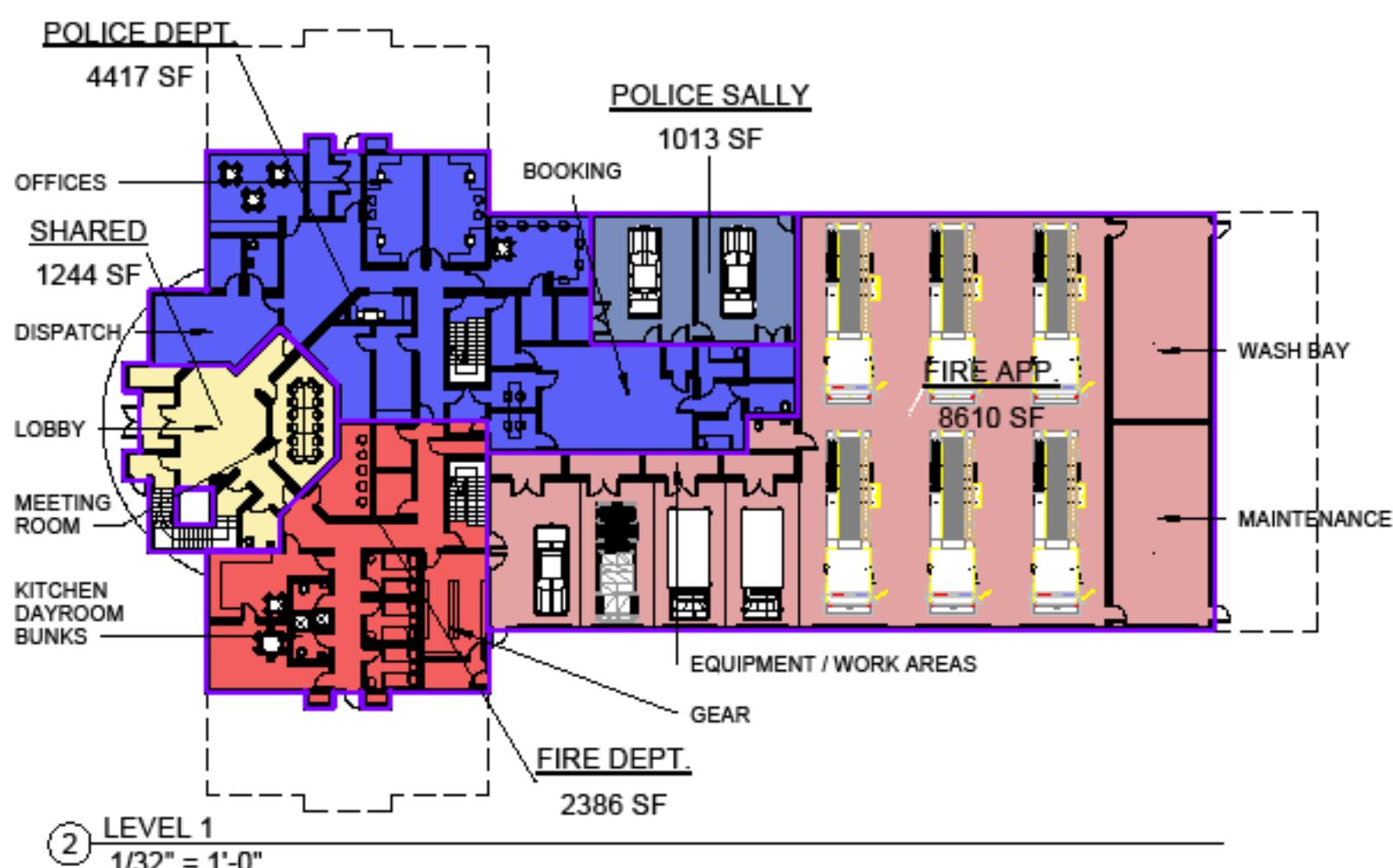
## CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

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AREA SCHEDULE	
DEPT.	AREA
EOC	432 SF
FIRE APP.	8610 SF
FIRE DEPT.	5789 SF
POLICE DEPT.	8031 SF
POLICE SALLY	1013 SF
SHARED	6100 SF
	29975 SF



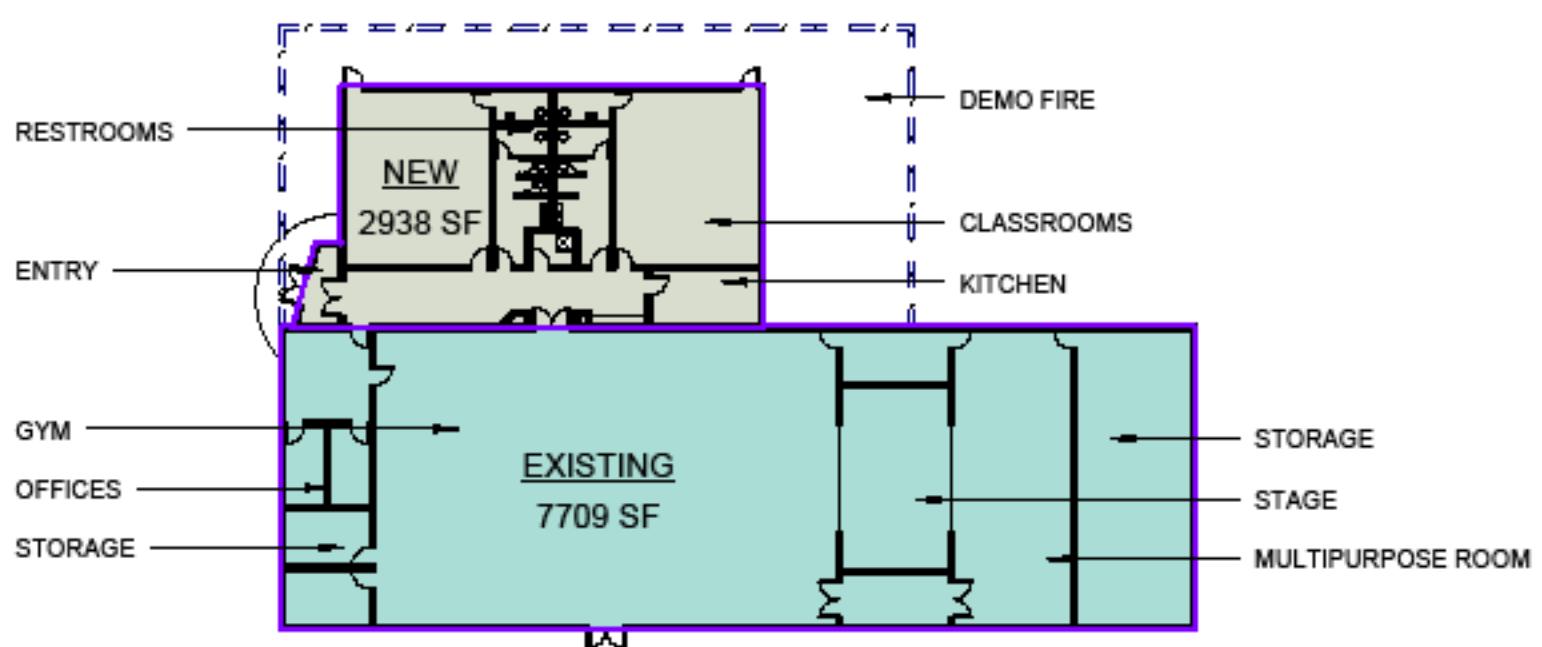
- EOC
- FIRE APP.
- FIRE DEPT.
- POLICE DEPT.
- POLICE SALLY
- SHARED

C-1

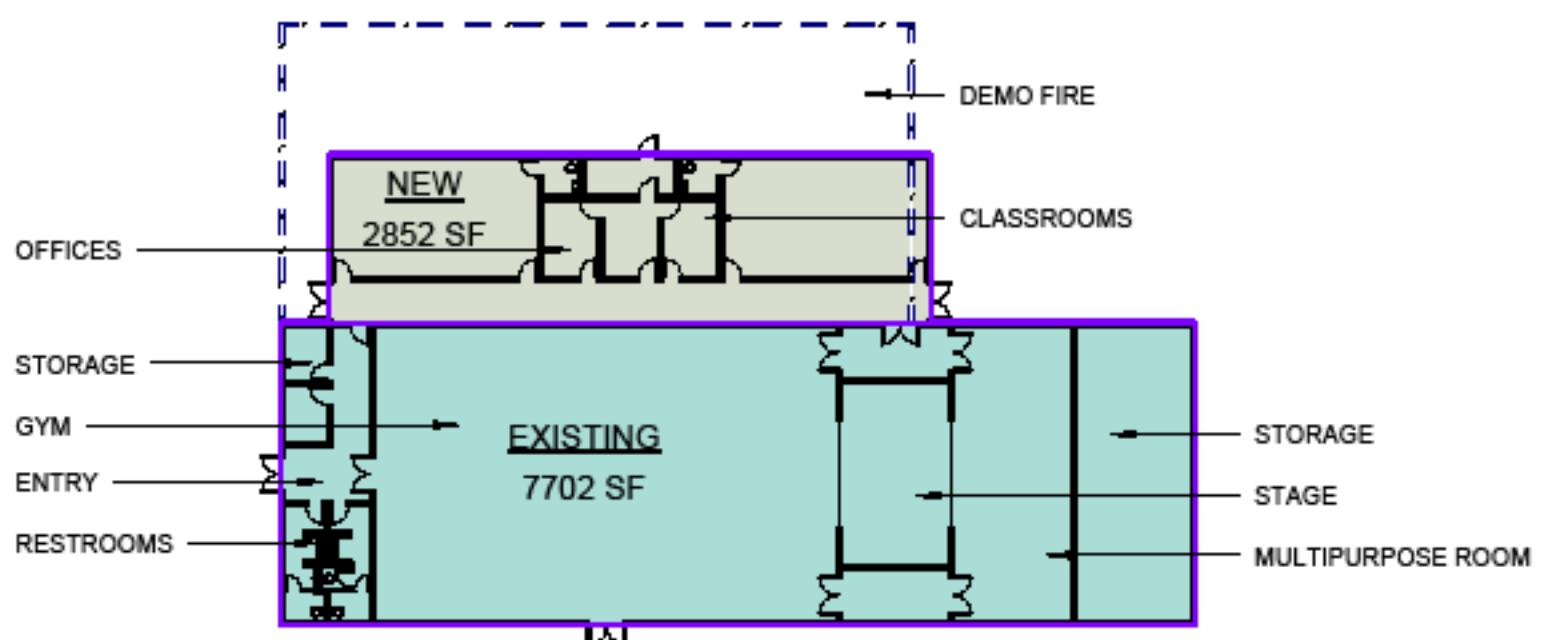
## CONCEPTUAL DESIGN OPTIONS

Bow Town Center and Public Safety Facility Study

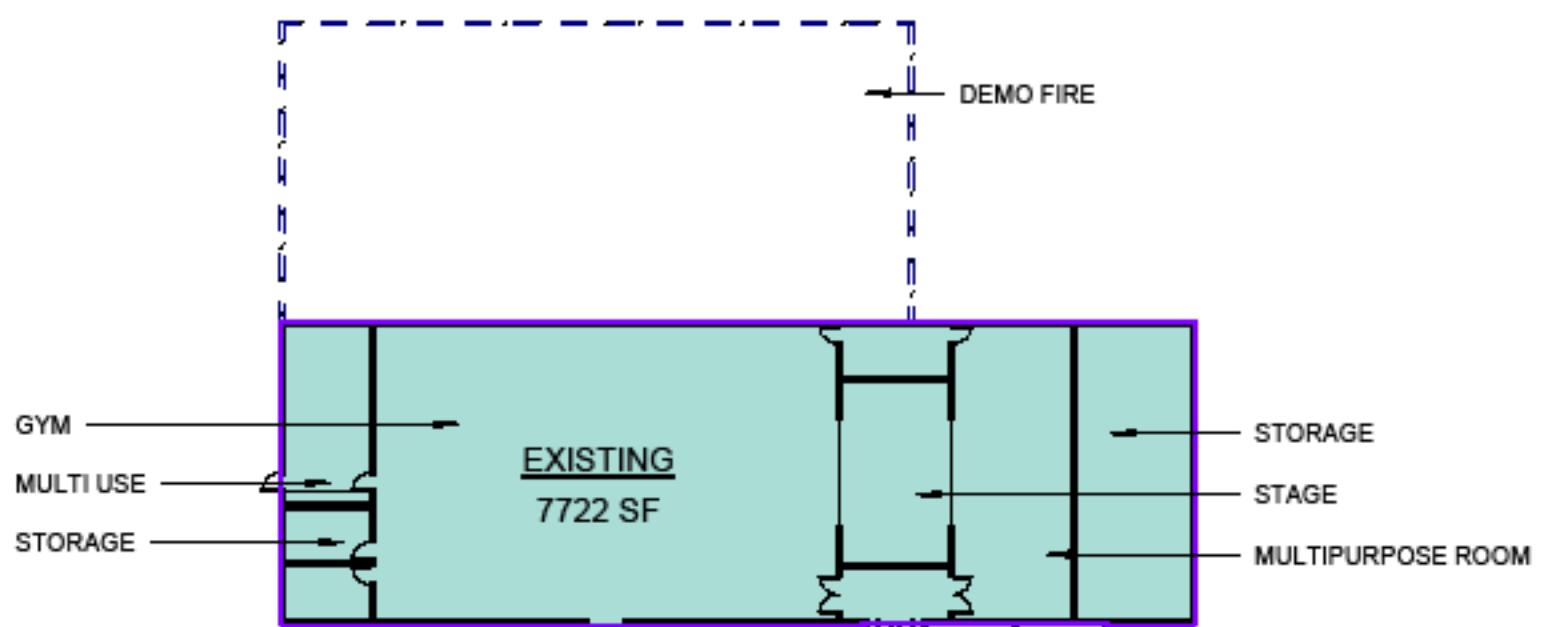
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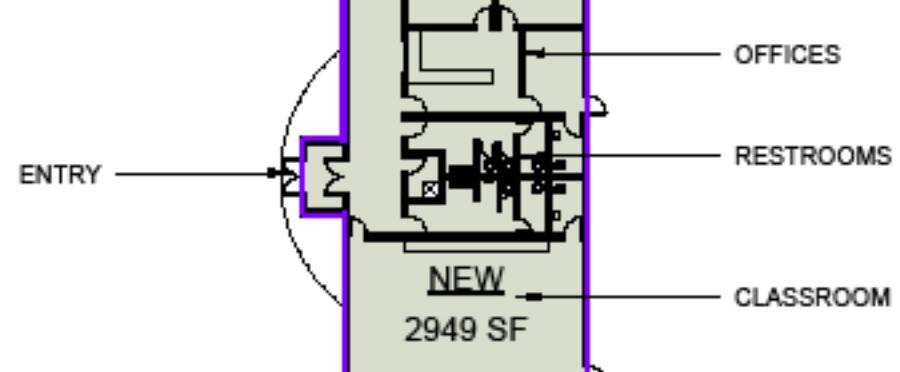
### **OPTION A**



### **OPTION B**



### **OPTION C**



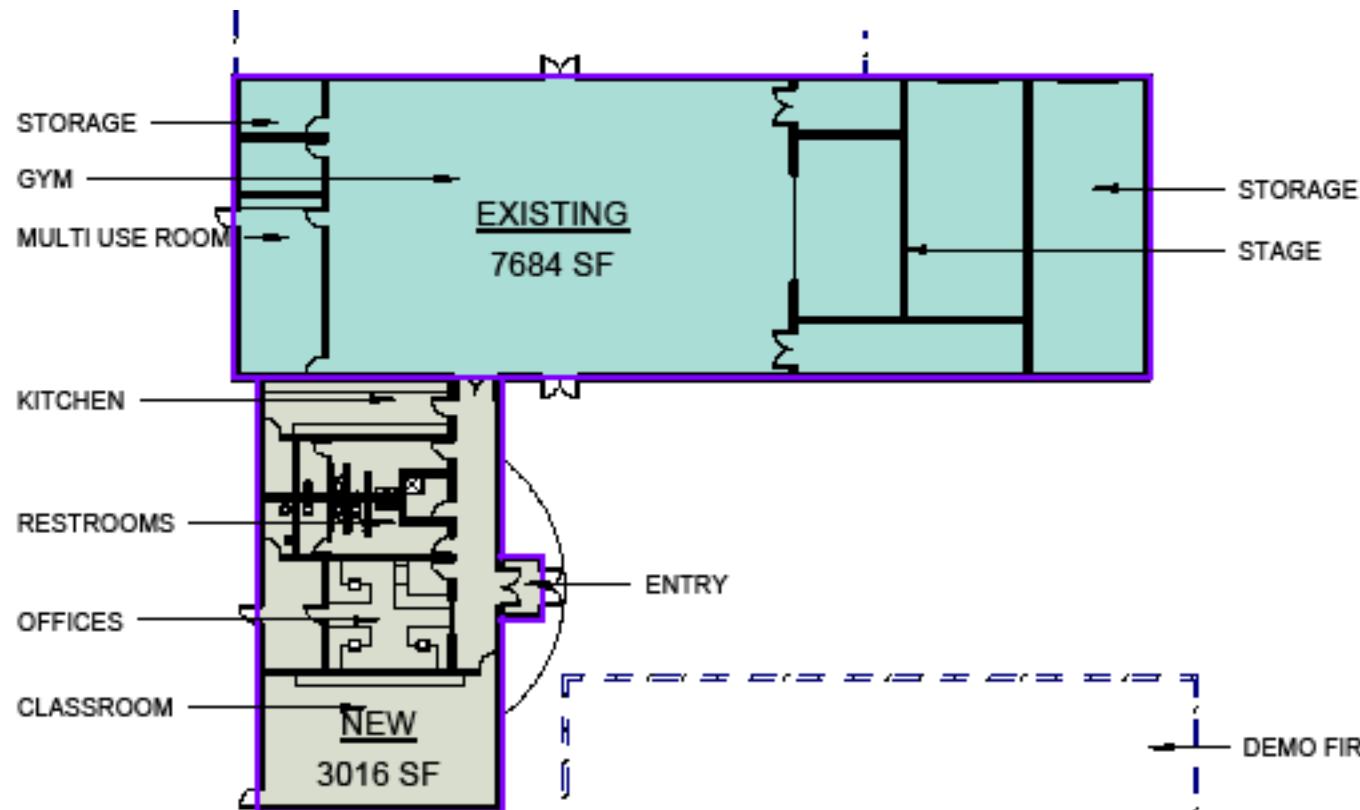
R-1

# **COMMUNITY/ REC BUILDING OPTIONS**

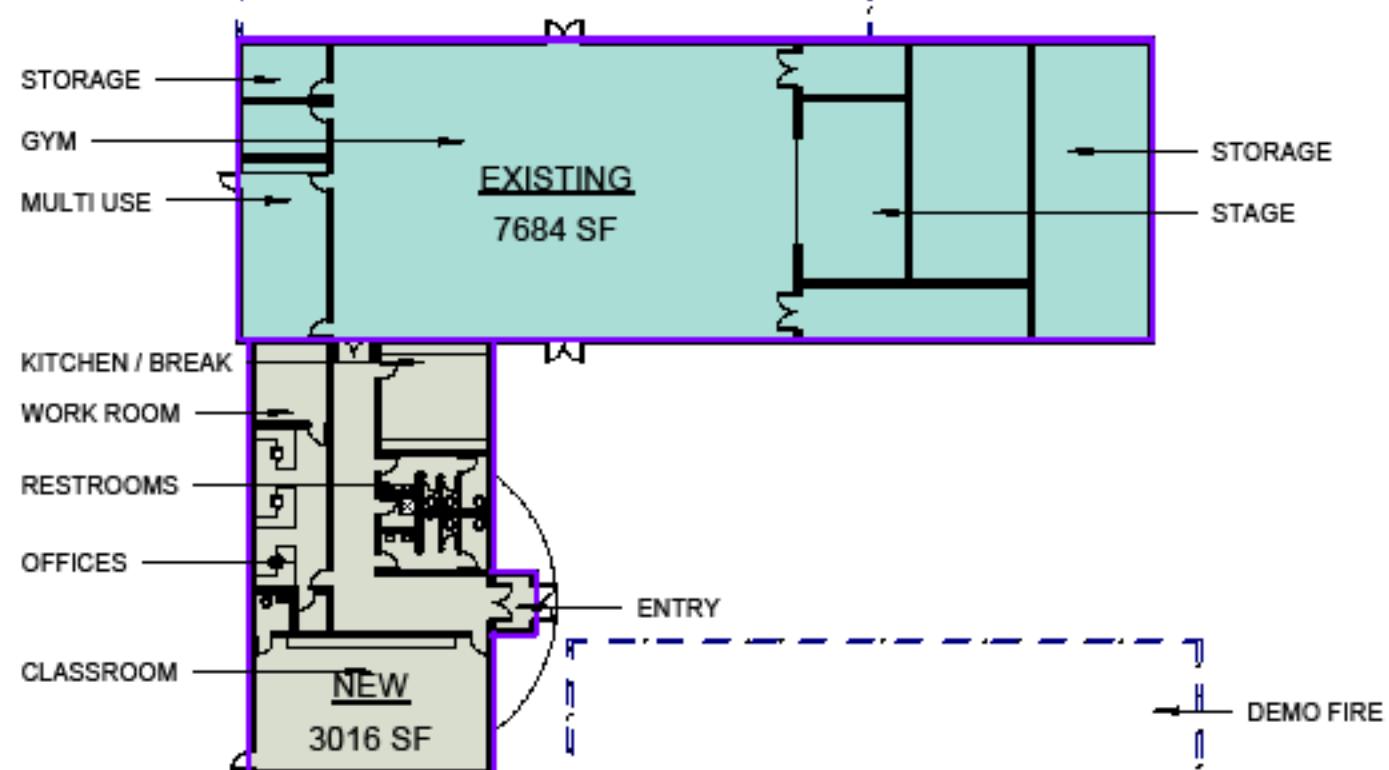
*Bow Town Center and Public Safety Facility Study*

Prepared By: The H.L. Turner Group Inc. ■ 27 Locke Road Concord, NH 03301 ■ 603.228.1122 ■ [www.hlturner.com](http://www.hlturner.com) ■ 09.21.11

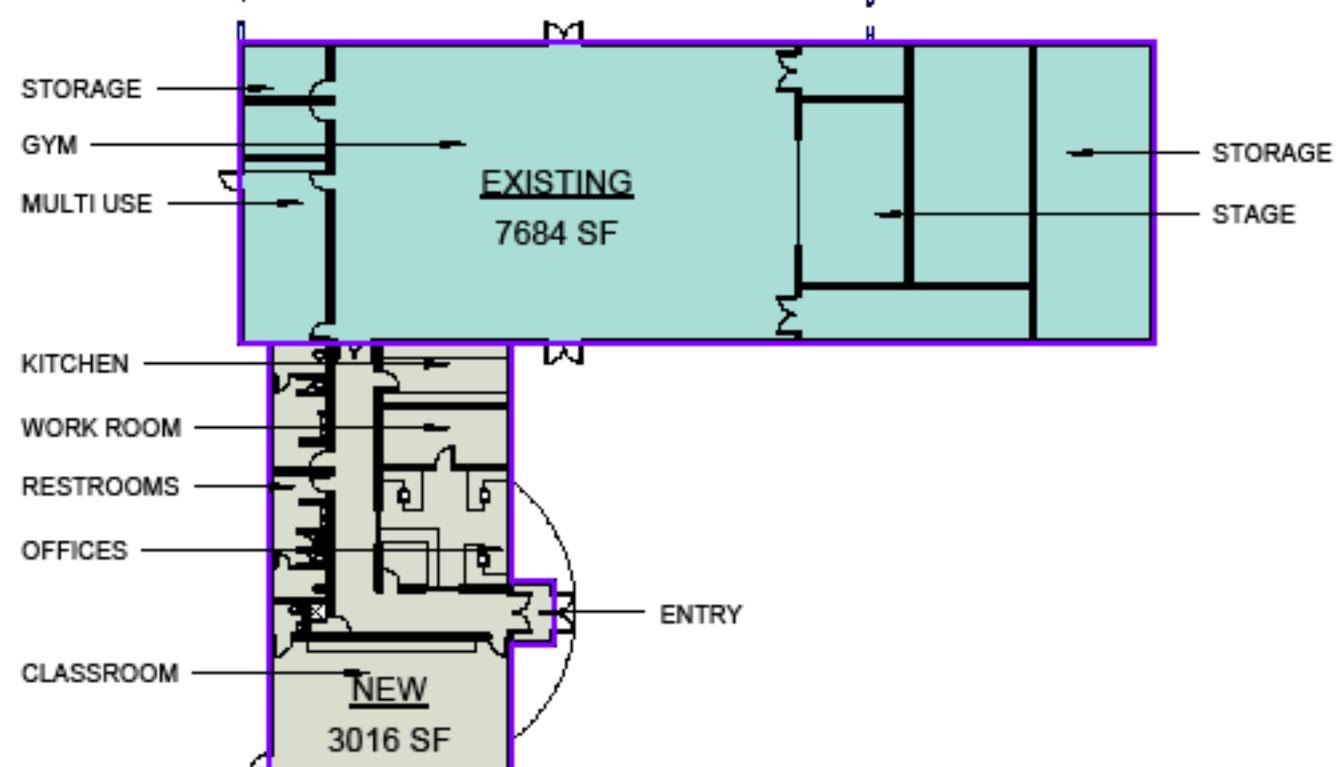
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### OPTION C1



### OPTION C2



### OPTION C3

R-2

# COMMUNITY/ REC BUILDING OPTIONS

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## TOWN CENTER UPGRADE REPORT

### VI. THE COST TO DO NOTHING

If the Town were to do nothing, there are numerous issues than may need to be addressed. We have broken this section into the two buildings.

#### COMMUNITY BUILDING

If the Town decides to do nothing at the community building, the effect on the fire department will be:

- No new larger or additional pieces of equipment could be added.
- The fire department personnel must continue to be housed in substandard conditions. Living quarters, locker rooms, and bathroom facilities will not be addressed unless the department is forced to.
- The fire department will continue to not have proper training and meeting areas.
- The fire department will continue to be housed in a structure that is not designed to resist a hurricane or seismic event.

#### POLICE / DPW BUILDING

If the Town decides to have the police department remain in their current facility and do nothing, the effect on the department will be:

- The moisture will continue to penetrate the masonry and the moisture intrusion will continue to cause issues.
- The lack of a sally port and proper booking areas and holding cells places the police officers unnecessarily in harms way.
- The building is not accessible and the Town may be forced to be reactive instead of being proactive in dealing with the issue.
- The police department will continue to be housed in a structure that is not designed to resist a hurricane or seismic event.