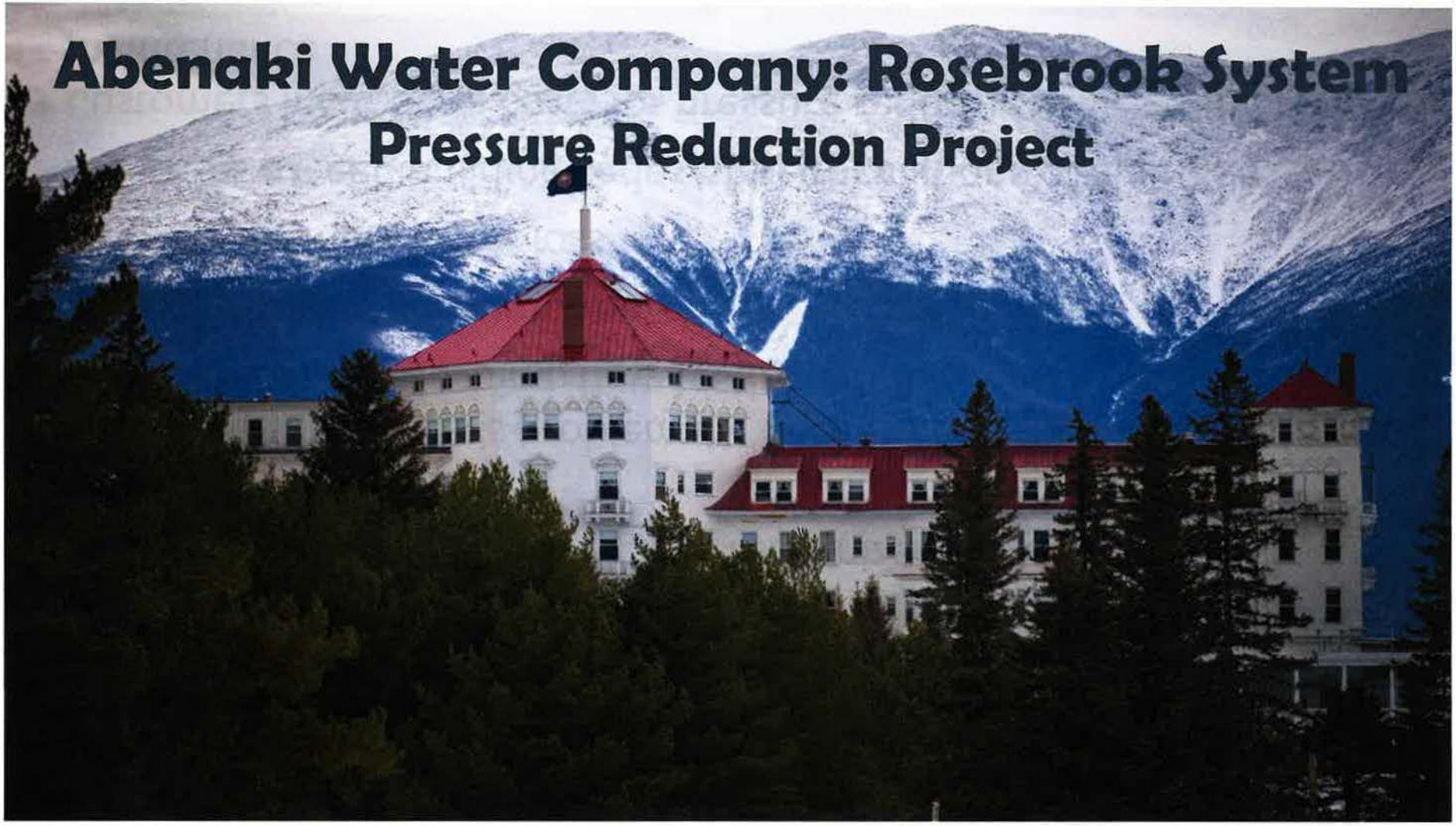
Abenaki Water Company: Rosebrook System

Pressure Reduction Project



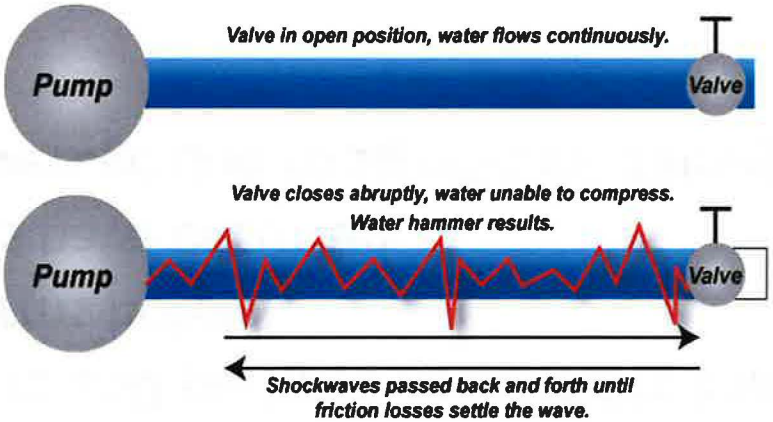
Pressure Issues

- Pressures are dangerously high as recognized by Abenaki, Twin Mountain FD and NHDES
- System maintenance is problematic because of dangerous conditions (valve exercising, flushing, flow testing, etc.)
- Excessive power consumption
- Potential for high water loss
- Pressures exceed building codes/state regulations of 80-100 psi
- Customers incur extra costs for pressure reducing valves (PRVs) and maintenance

Pressure Issues (Cont.)

- Genuine risk of catastrophic failure in the system (FX Lyons experienced a serious incident at pump station in 2011 resulting in TV coverage)
- Severe pressure surges/waves up to 250 psi have occurred in the past at the Omni Resort and Bretton Arms hotels
- Other significant failures/incidents have occurred
- Past non-renewal of insurance coverage due to significant damage claims in 2016

Water Hammer



Water Hammer

- Photo of a dramatic water hammer effect. This is a booster pump station that was destroyed by a pressure surge

- Water hammer is also responsible for pipeline failures

Goals

- Establish lower pressure gradients for the system
- Maintain high level of domestic service
- Improve system safety, reliability and operation
- Maintain adequate fire flows per ISO recommendations
- Reduce lost water (UAW)
- Reduce power consumption
- Upgrade the system and reduce operating and maintenance costs over time
- Improve monitoring and treatment process

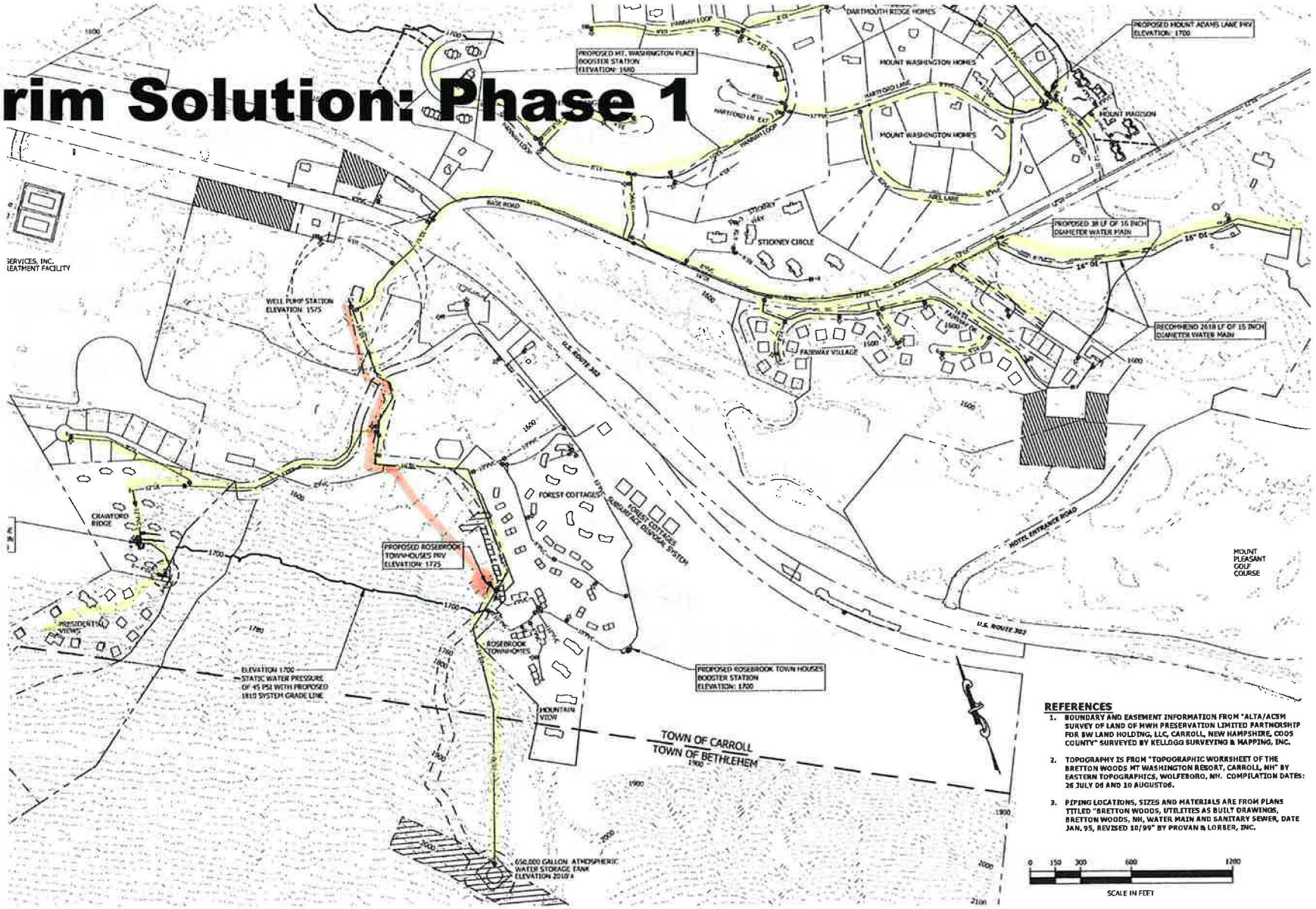
Pressure Reduction Project Cost and Phasing

- Total project cost approximately $2.3 M
  - Construction and testing of three booster stations
  - Water main extensions new well pumps and motors
  - New water storage tank
- Phase 1: Reduce pressure at well # 1 and well #2
- Phase 2: Replace water storage tank
- Phase 3: Reduce overall system pressure to 100 psi max

Phase 1

- Phase 1 project cost approximately $940,000
  - Reduce pressure at pump house (wells) to approximately 100 psi
  - Construct one new booster station (BPS)
  - Construct a direct transmission main from wells to new BPS
  - Maximum system pressure at OMNI and at low elevations will remain at 200 psi until next phases are implemented
  - All components installed in easements obtained from OMNI

Interim Solution: Phase 1



REFERENCES

1. BOUNDARY AND EASEMENT INFORMATION FROM "ALTA/ACSM SURVEY OF LAND OF MWH PRESERVATION LIMITED PARTNERSHIP FOR BW LAND HOLDING, LLC, CARROLL, NEW HAMPSHIRE, COOS COUNTY" SURVEYED BY KELLOGG SURVEYING & MAPPING, INC.
2. TOPOGRAPHY IS FROM "TOPOGRAPHIC WORKSHEET OF THE BRETTON WOODS MT WASHINGTON RESORT, CARROLL, NH" BY EASTERN TOPOGRAPHICS, WOLFEBORO, NH. COMPILATION DATES: 26 JULY 06 AND 10 AUGUST06.
3. PIPING LOCATIONS, SIZES AND MATERIALS ARE FROM PLANS TITLED "BRETTON WOODS, UTILITIES AS BUILT DRAWINGS, BRETTON WOODS, NH, WATER MAIN AND SANITARY SEWER, DATE JAN. 95, REVISED 10/99" BY PROVAN & LORBER, INC.

Benefits of Phase 1

- Postpone other improvements and associated costs while achieving the goal of reducing pressure at well
- Gets closer to final project outcome
- Phase 1 improvements can stand alone and integrate into overall project while becoming immediately used and useful.
- Immediate reduction in pump house pressure
- Reduced water hammer and high pressure concerns (at well but not in total system)
- No change in OMNI pressure or fire flow
- Allows for phased in costs (mitigate amount of rate increases)

Total Project Cost and Phasing

- Phase 1 - Interim system improvements $940,000 (12 months). Reduction in well house pressure.

- Phase 2 – New water storage tank $500,000 (year 2). This will replace the existing tank.

- Phase 3 – Construction of two booster stations and other system improvements $900,000 (years 3 and 4). Lowers system pressure to 100 psi, max. Ensures adequate fire protection pressure and flows.

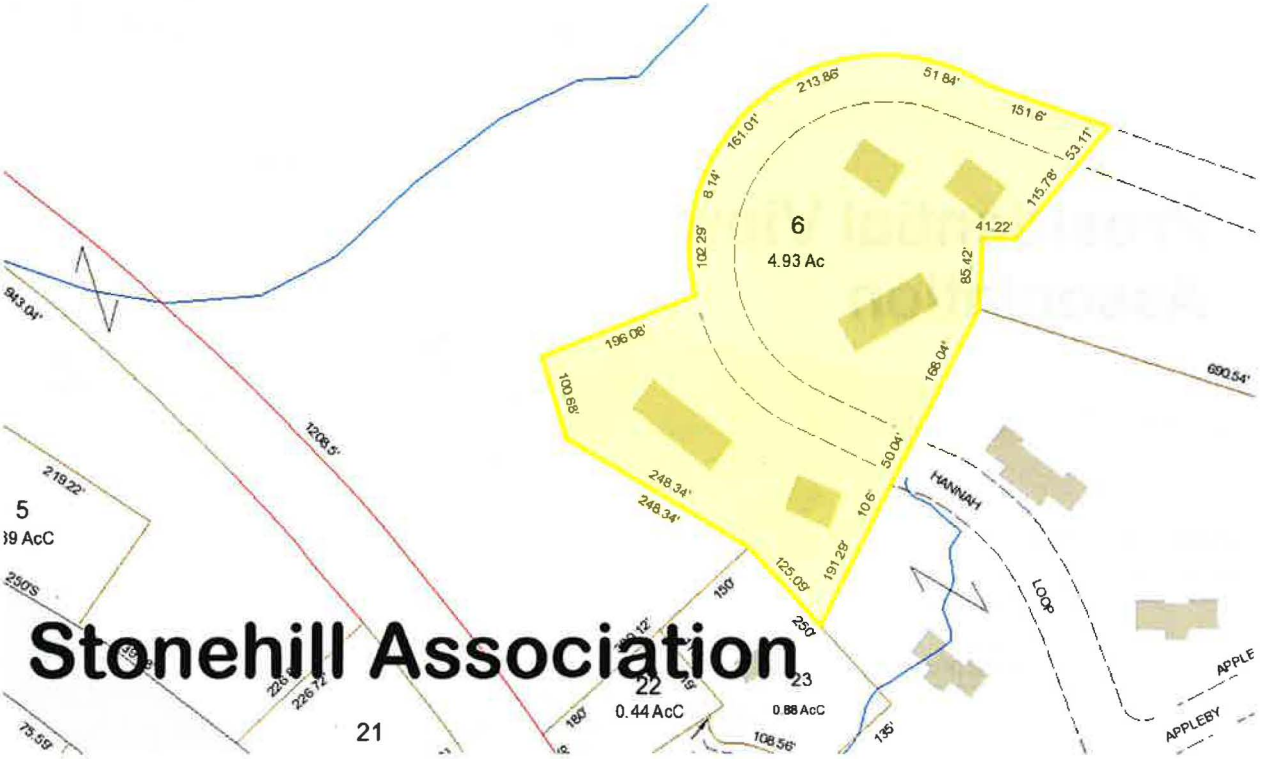
Phased Rate Increases

- Phase 1 Rate Increase 28%
- Phase 2 - TBD
- Phase 3 - TBD

Next Steps – Phase 1

- Obtain easements
- Design Phase 1
- PUC approval
- Phase 1 improvements over 1 construction season

Attachment B – Common Areas Defined



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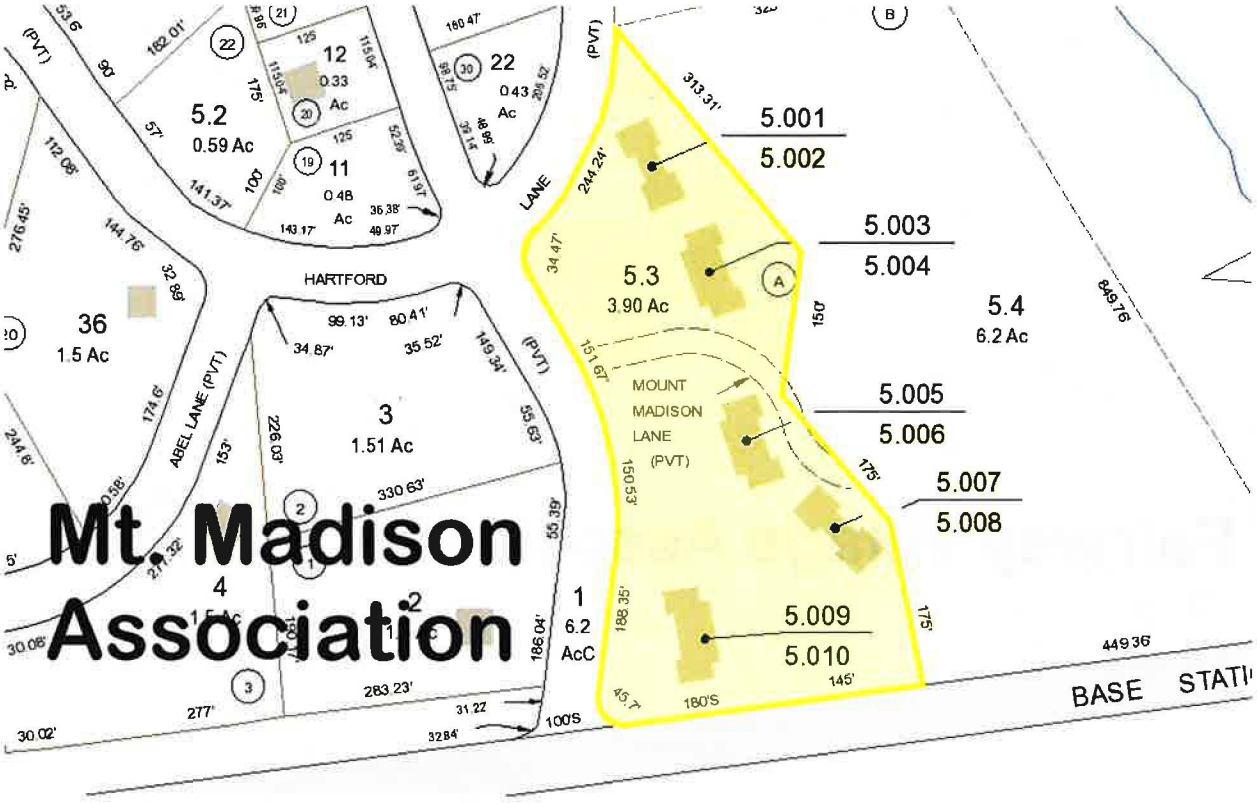

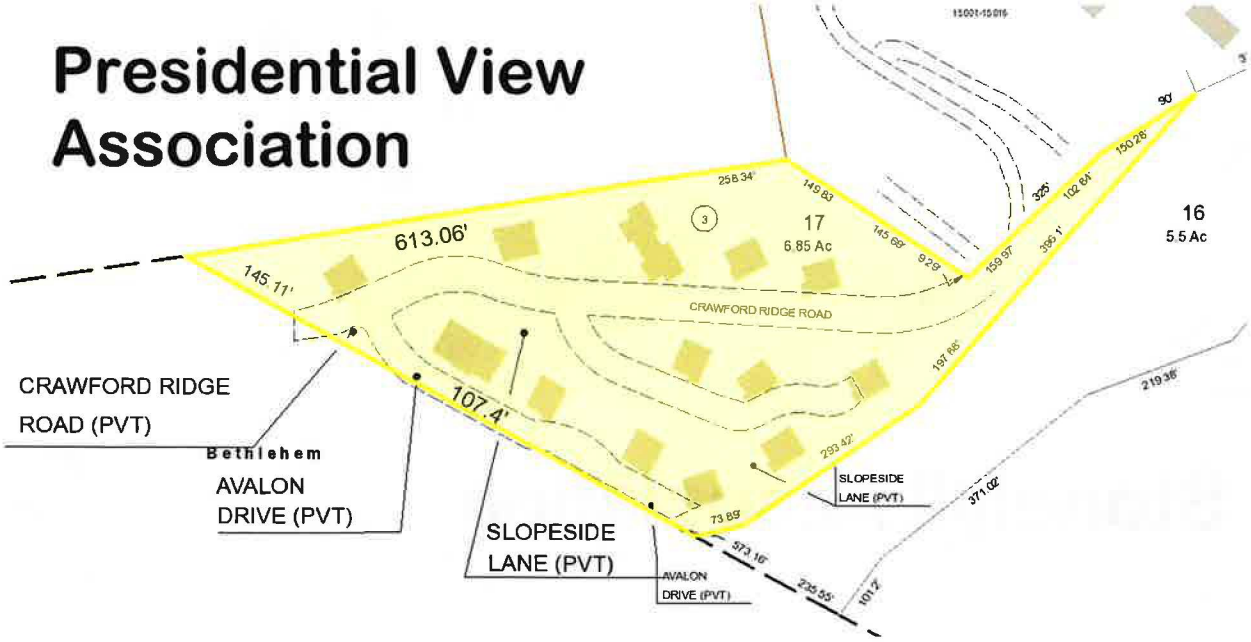

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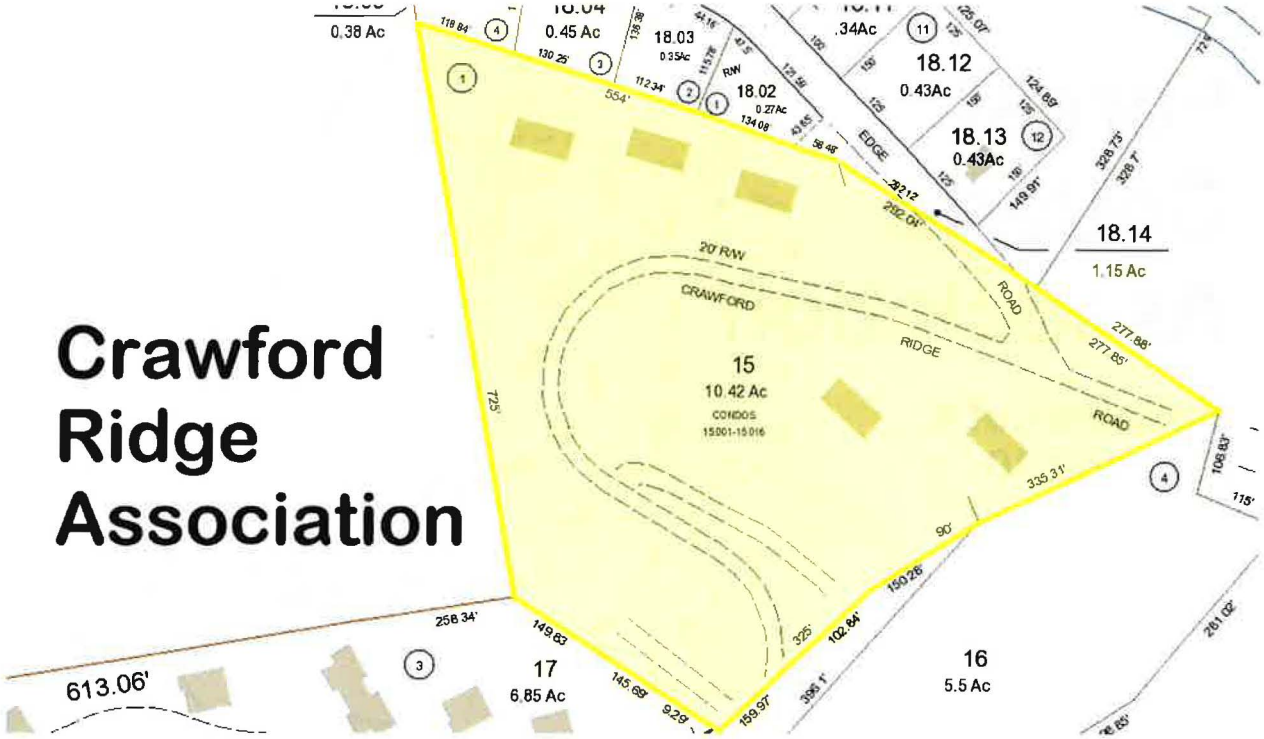

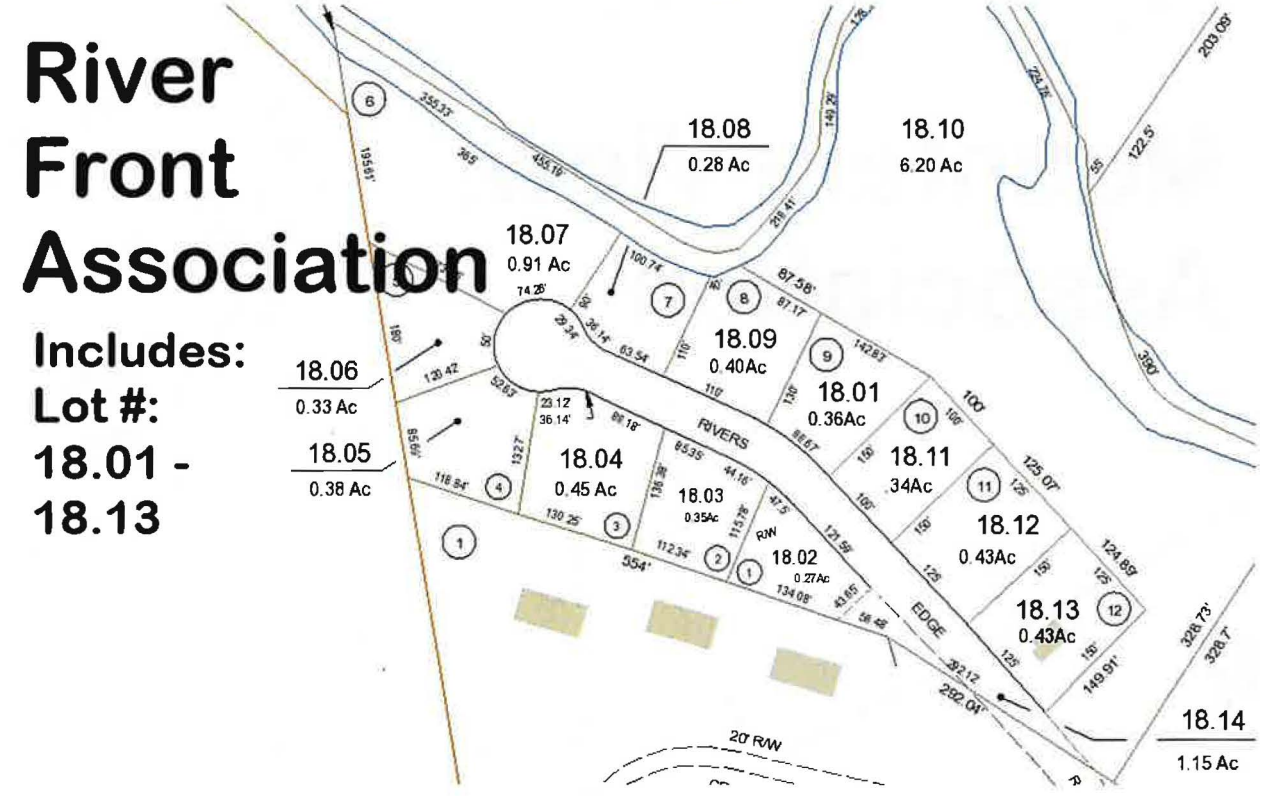

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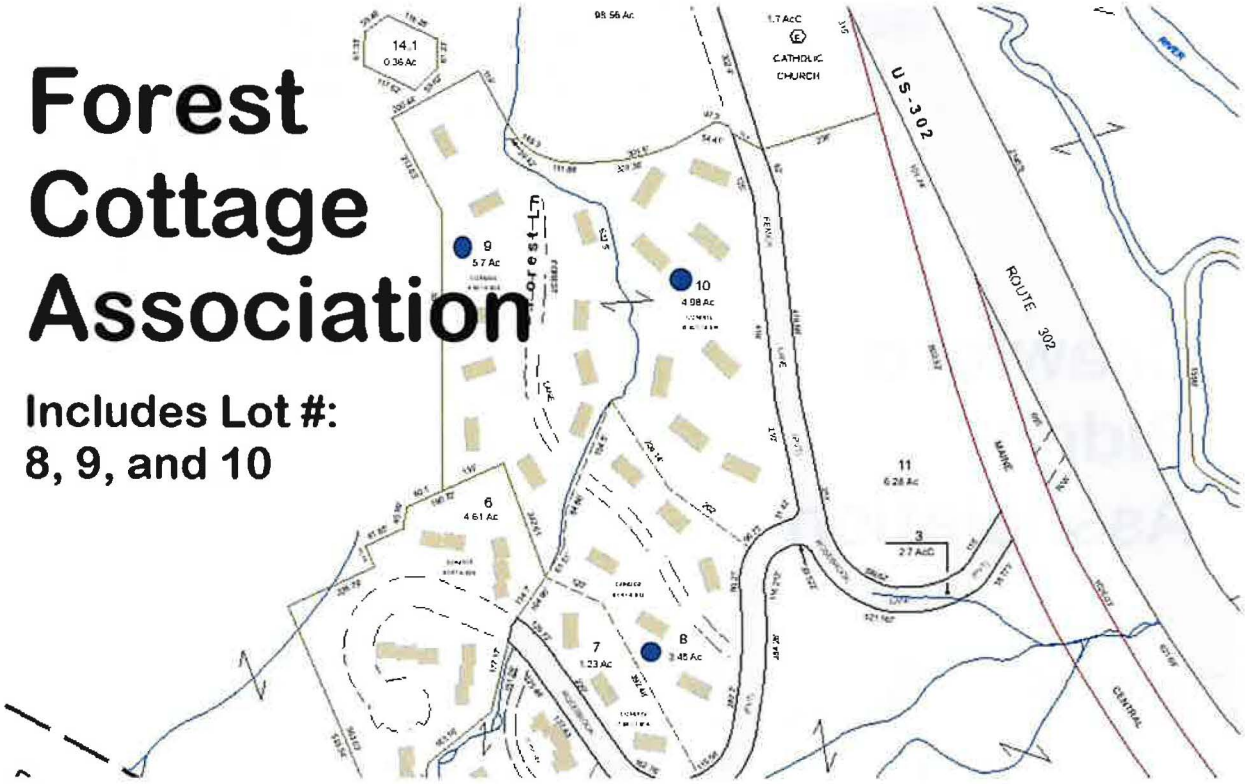
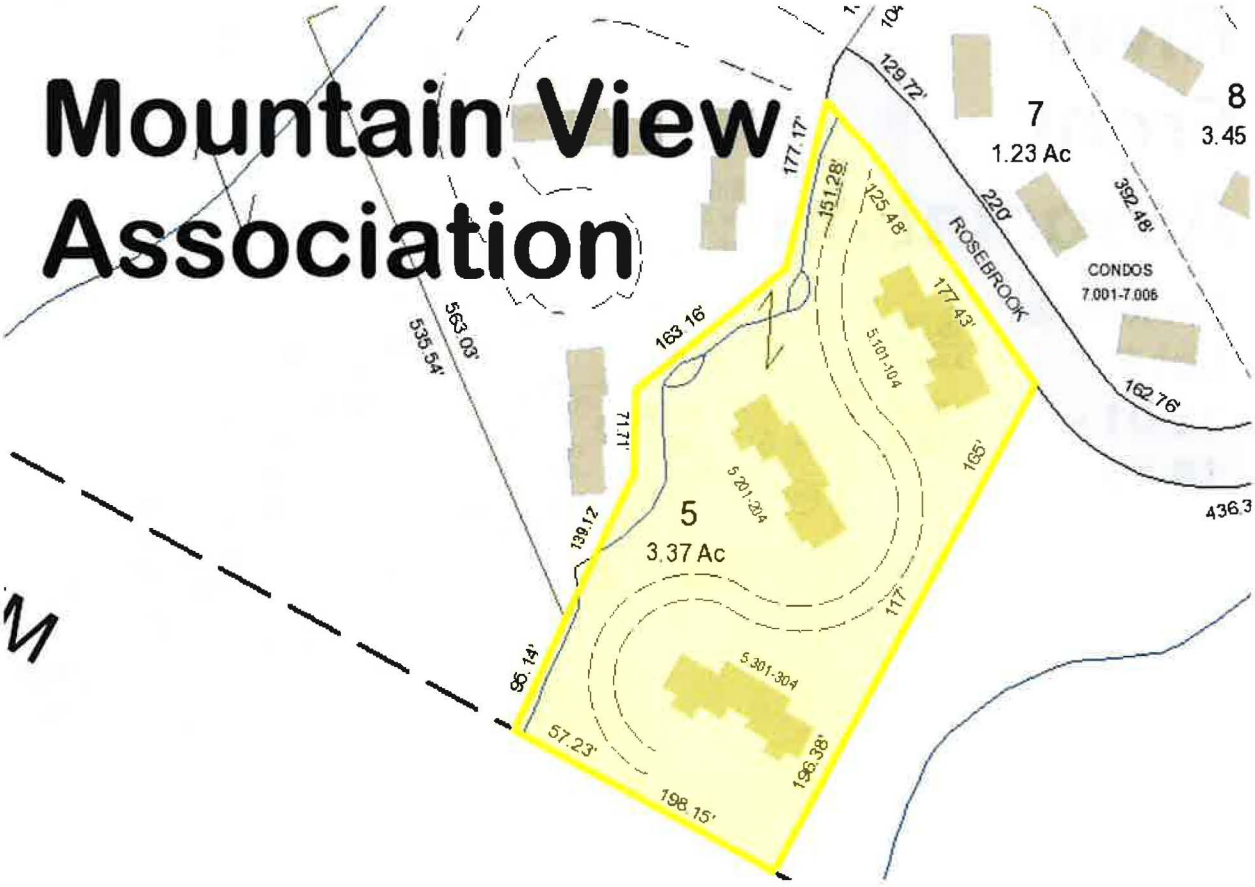
Forest Cottage Association

Includes Lot #:
8, 9, and 10



Mountain View Association



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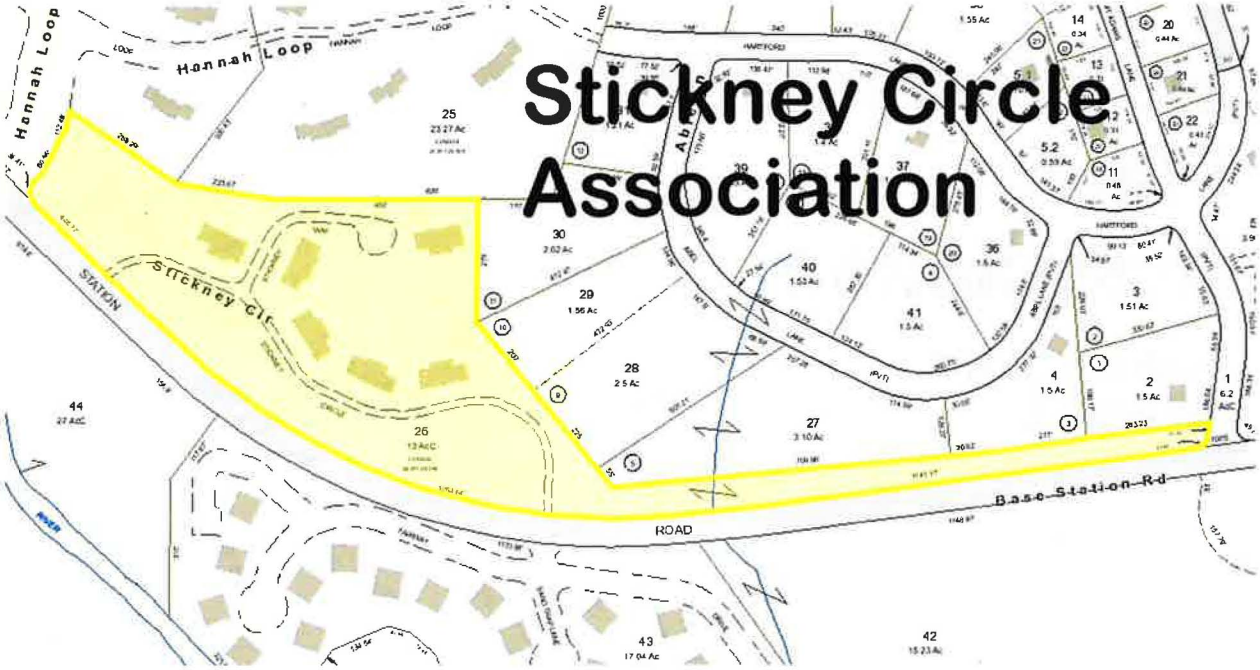

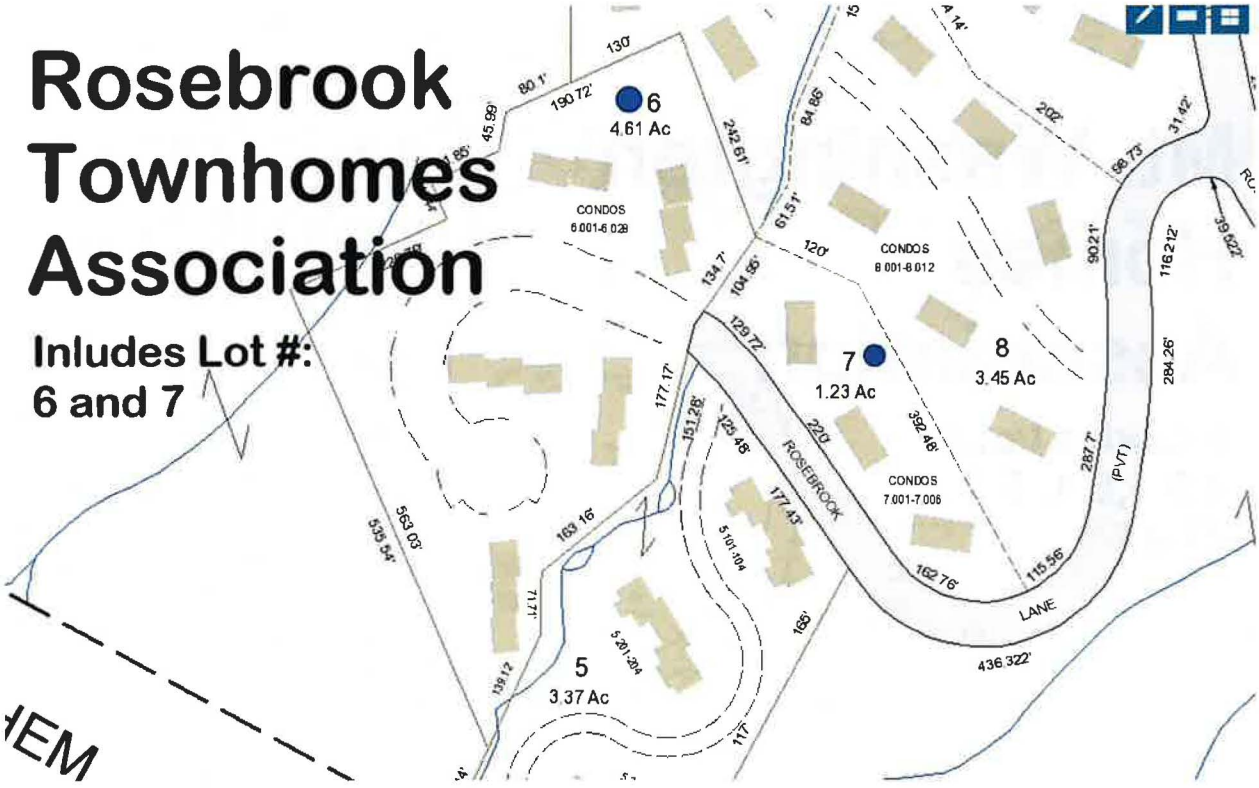

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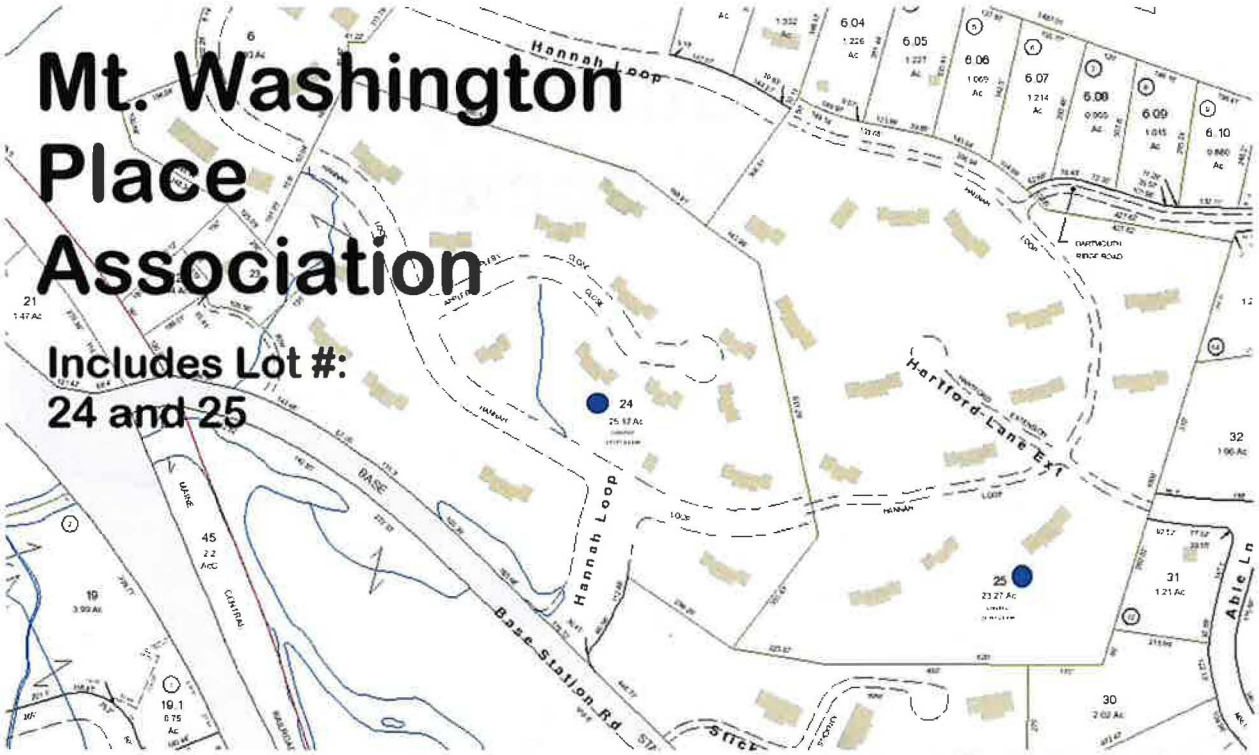

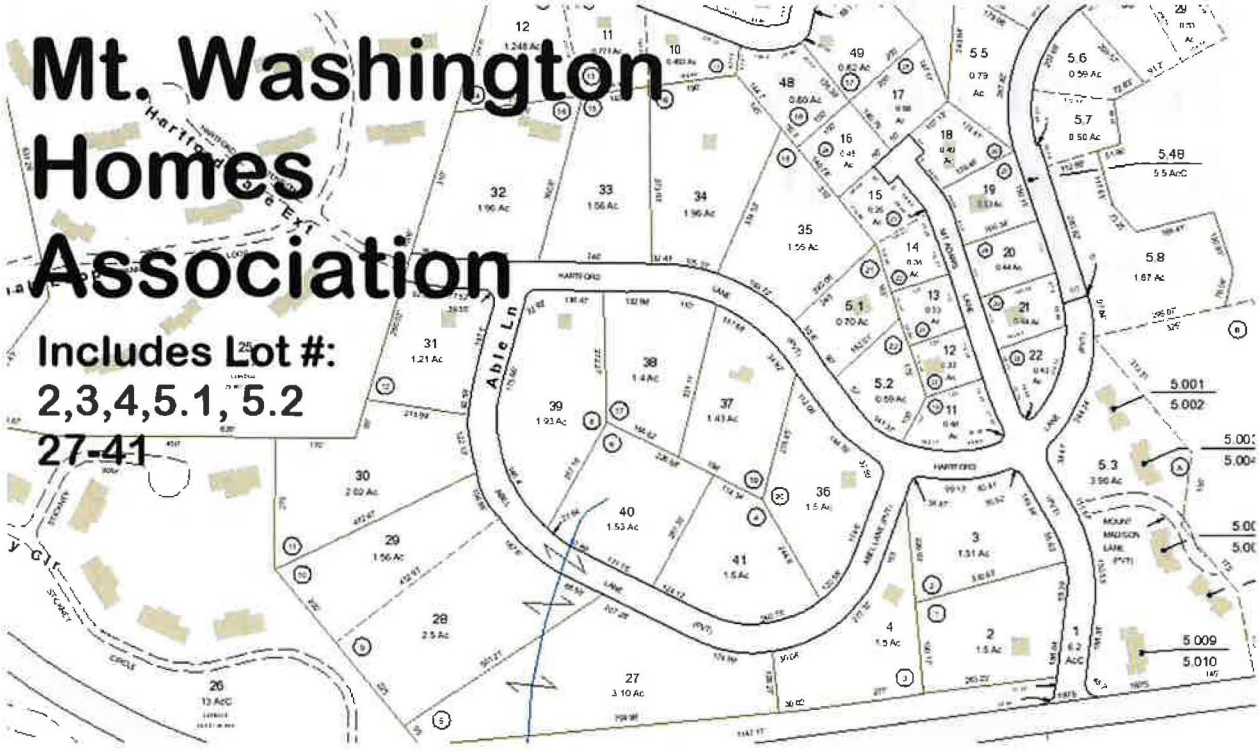

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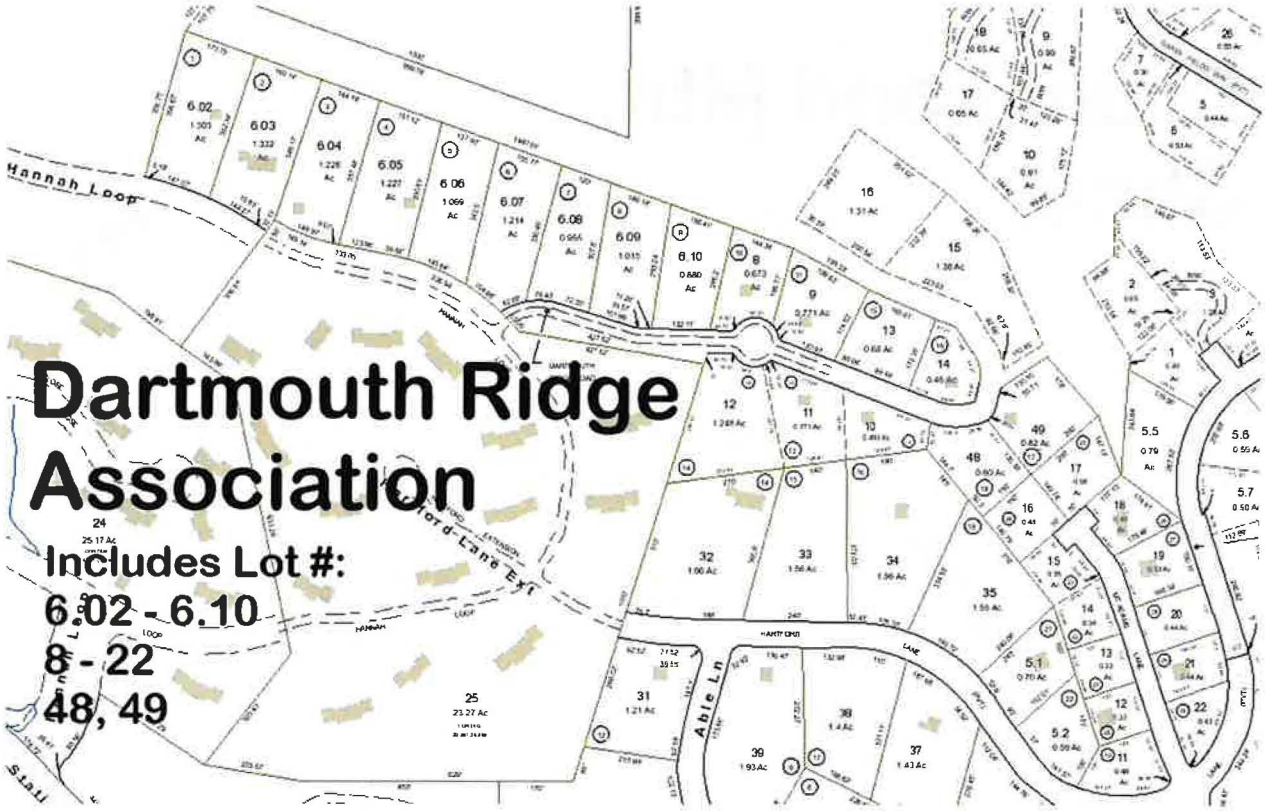

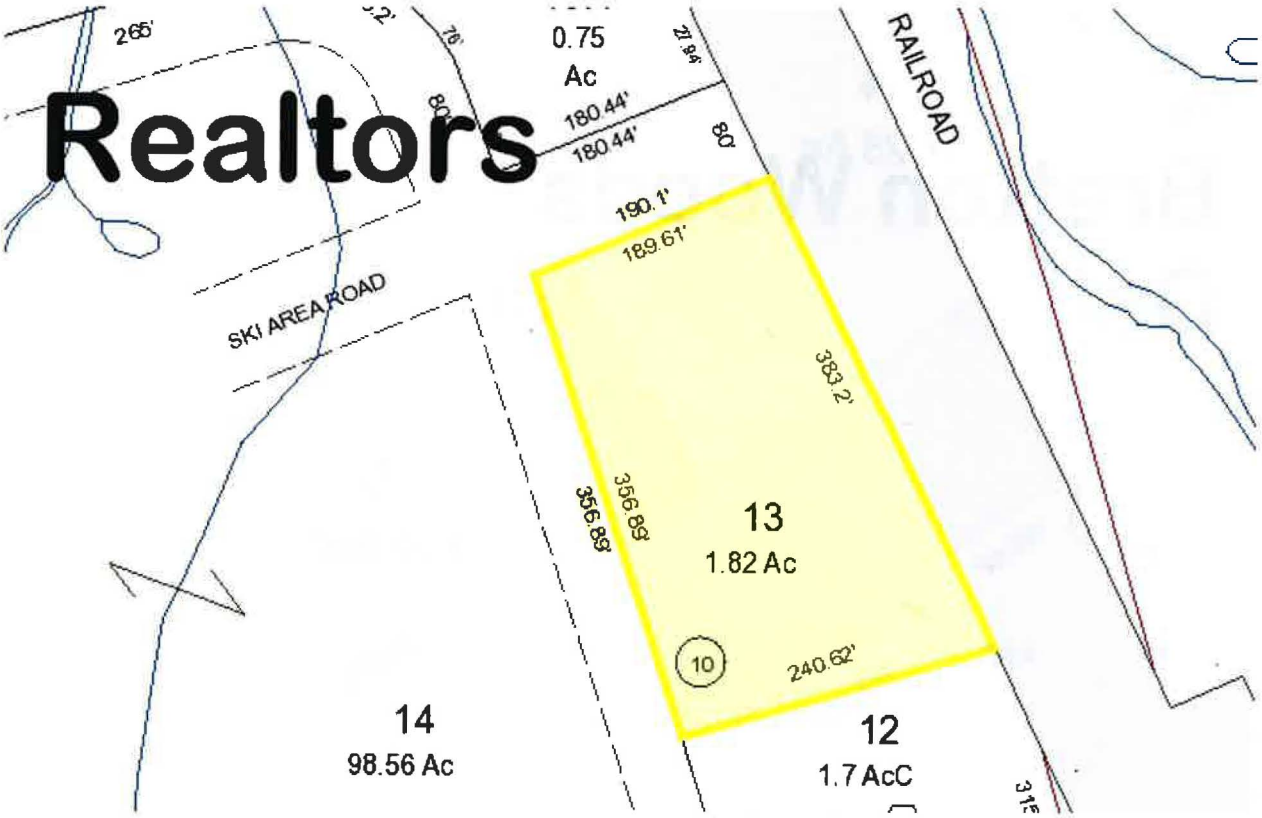

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