



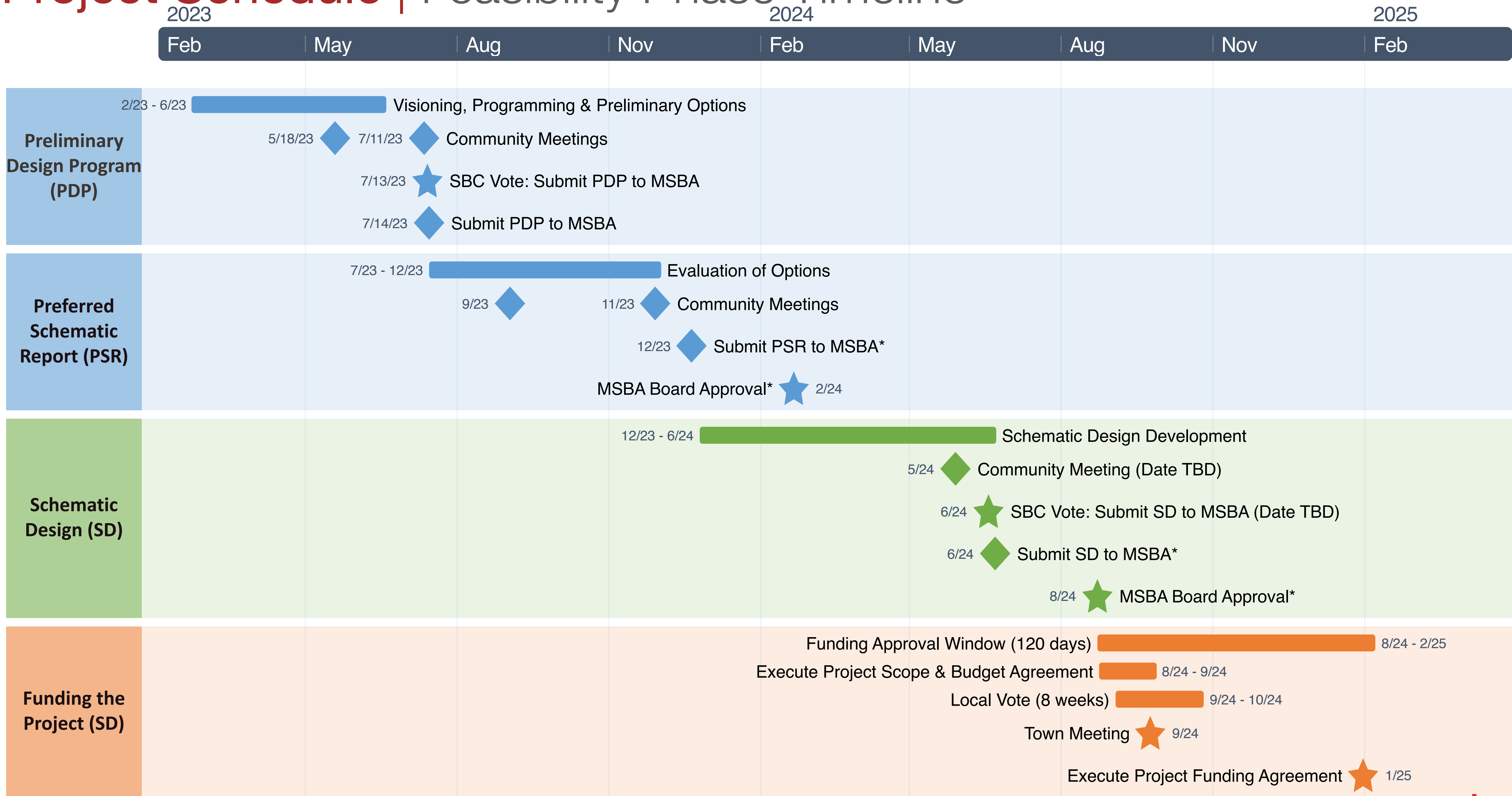
Community Forum

BURLINGTON ELEMENTARY SCHOOL

Burlington, MA

December 05, 2023
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Project Schedule | Feasibility Phase Timeline



School Building Committee | Project Goals

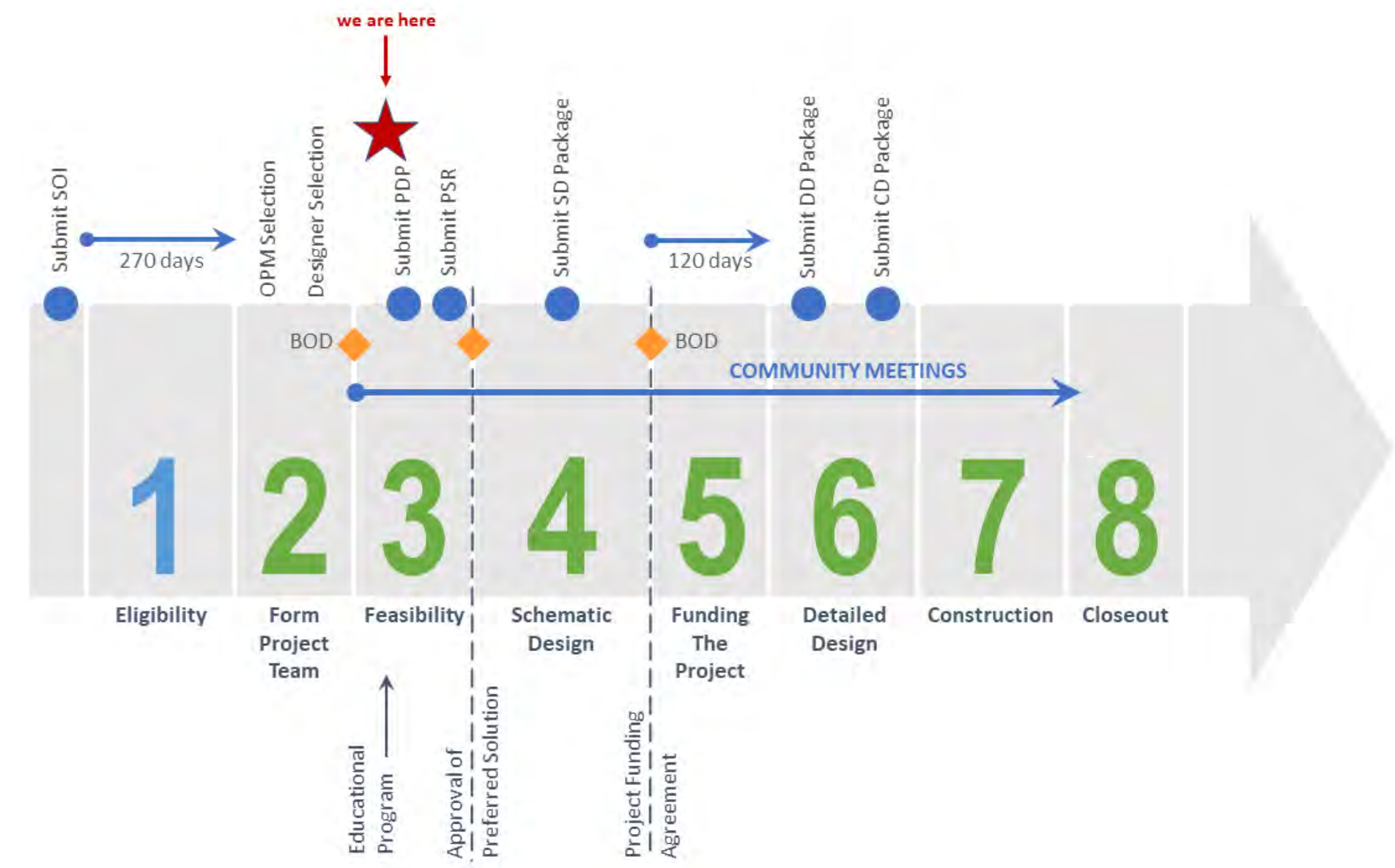
- Cost efficiency
- Building efficiency
- Sustainability
- Quality of materials
- Security and technology
- 21st Century learning
- Building that meets enrollment
- Building meets needs of students and staff for effective learning
- Flexible and adaptable learning space that meets educational program
- Collaborative student-centered education
- Design to accommodate future technological advances in teaching tools
- Outdoor spaces
- Community involvement and input
- Healthy learning environment



MSBA Process

The MSBA delivers a project through a clearly defined and prescribed process utilizing “modules”

- Module 1 – Eligibility Period
- Module 2 – Forming the Team
- **Module 3 – Feasibility Study** ←
- Module 4 – Schematic Design
- Module 5 – Funding the Project
- Module 6 – Detailed Design
- Module 7 – Construction
- Module 8 – Completing the Project



MSBA Process

Module 3 Activities - Feasibility Study:

Preferred Schematic Report (PSR) - December 21, 2023

- Summarize the process and conclusions of the Preliminary and Final Evaluation of Alternatives
- Cost comparison table
- Document District's selection and recommendation of the most cost effective and educationally appropriate preferred solution to the MSBA
- Submit Preferred Schematic Report (PSR)

MSBA Board Approval of PSR - February 28, 2024

Module 4 Activities — Schematic Design:

Schematic Design Submission - June 27, 2024

- Final design program
- More detailed estimates
- Preliminary Plans / Specs

MSBA Board Approval of Schematic Design - August 28, 2024



Evaluation of Alternatives | Thought Exchange Results

Question:

- What are some important priorities and perspectives to consider as we plan for improvements of our school buildings?

Engagement

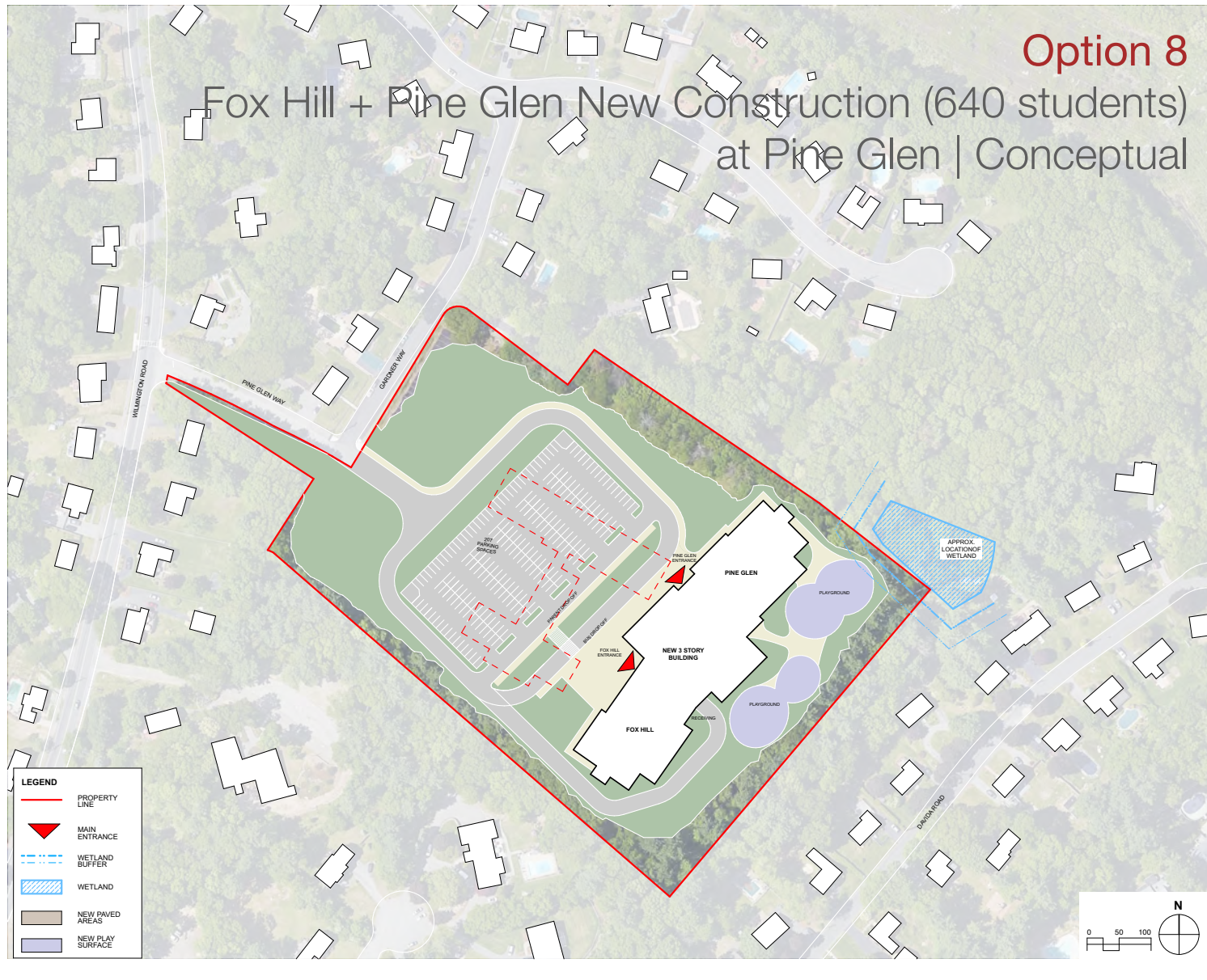
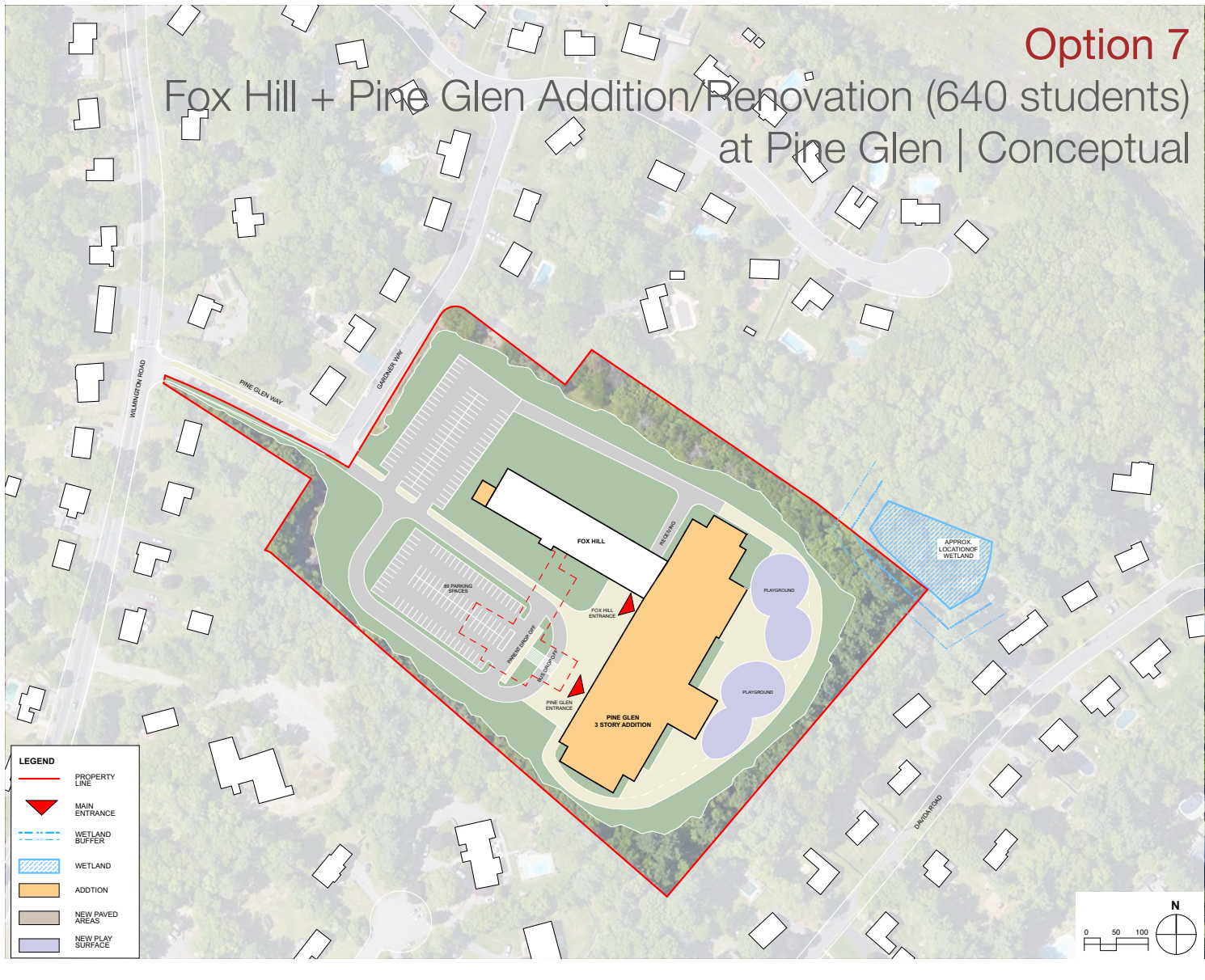
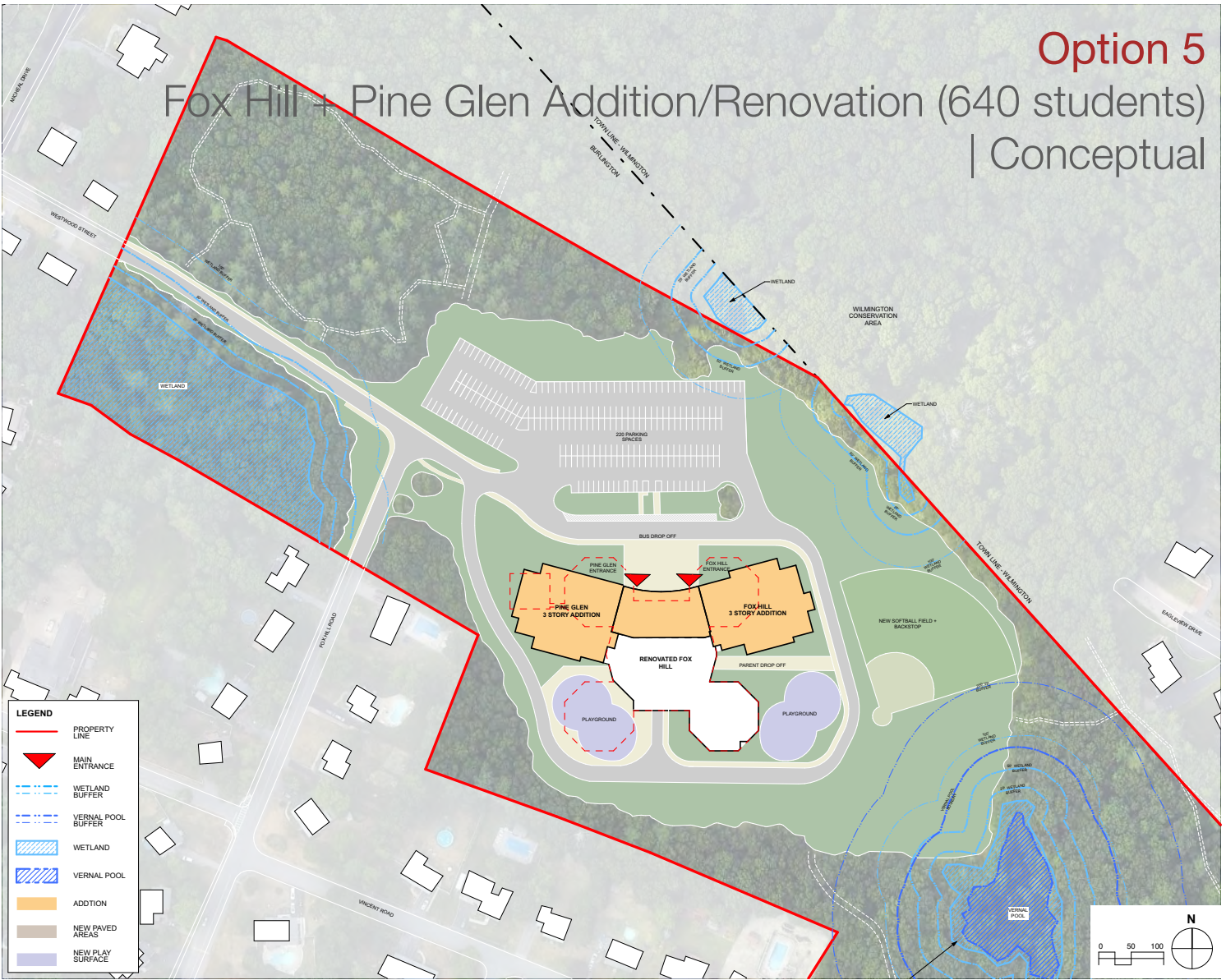
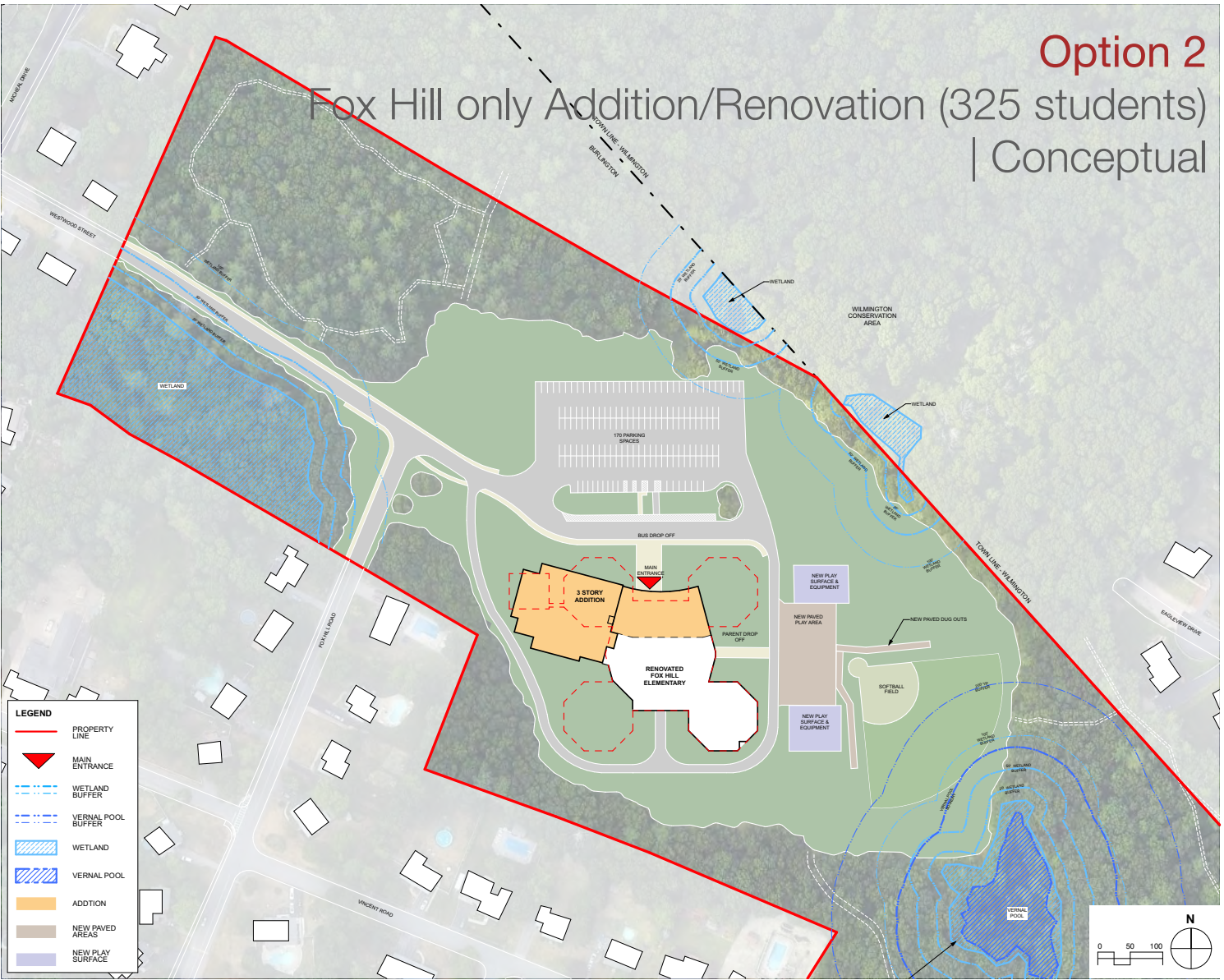
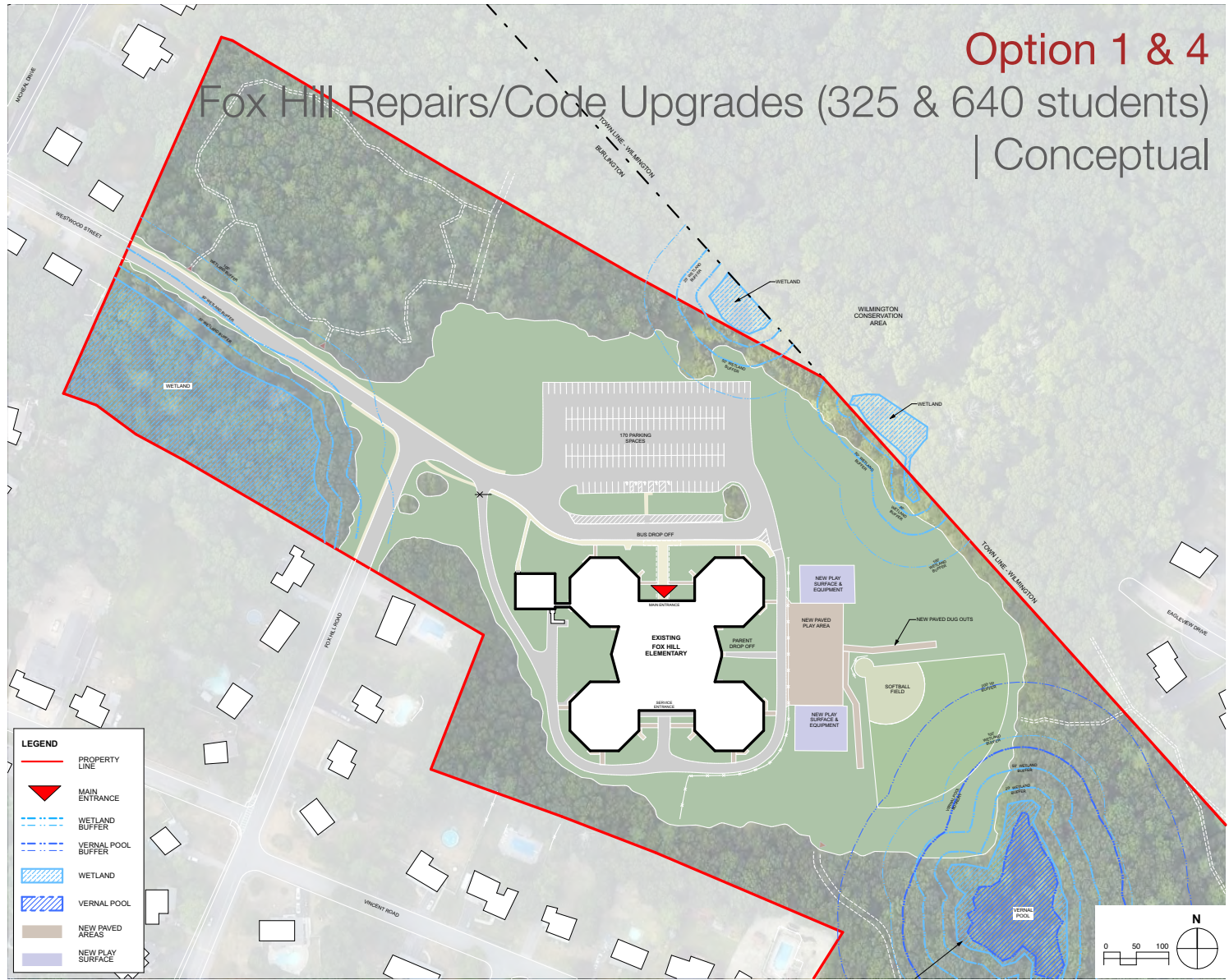
Review your current engagement statistics to understand how engaged participants are on this topic.



AI Summary:

- The responses to the asked question suggest that **the majority of people** are in **favor** of **keeping four separate elementary schools on four separate sites**. Many people have expressed their concerns about the potential traffic nightmare, safety of the children, and the impact on the neighborhood and its residents. Additionally, people have highlighted the importance of **small class sizes**, adequate space for **specialized learning**, and the **mental health** needs of the children. Furthermore, people have also mentioned the importance of **transparency in the process**, the impact of **taxes**, and the need to consider why residents are sending their kids to private schools. Overall, the responses suggest that the community is in favor of keeping **four separate elementary schools on four separate sites**.

Evaluation of Alternatives | Alternatives Dismissed



Evaluation of Alternatives | Alternatives Remaining



School Building Committee eliminated all alternatives except:

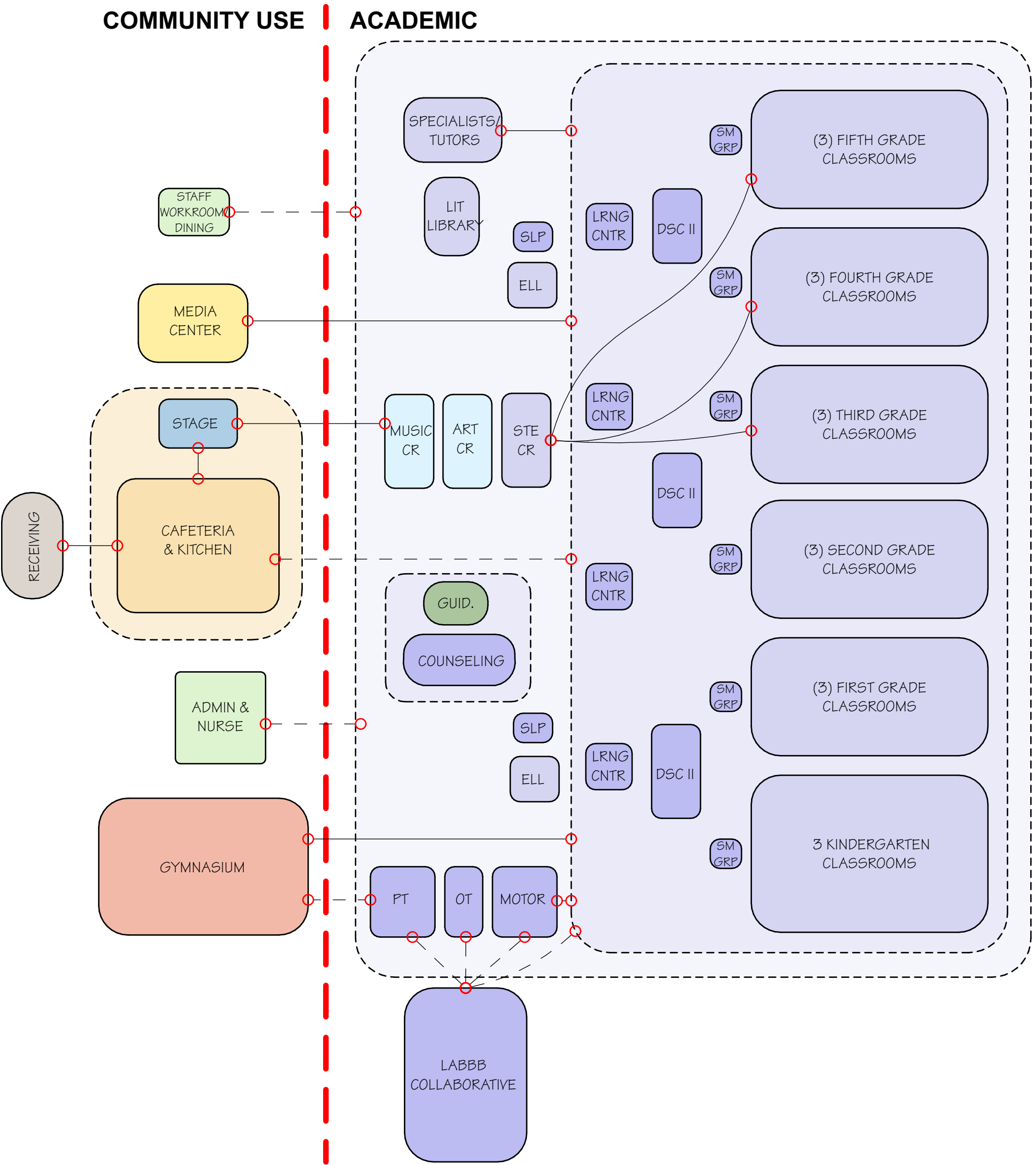
- Option 3 | New Construction at Fox Hill School only (Enrollment 1)

Alternative	Description	Location	# of students	# of classrooms	Solution
Option No. 1	Code Upgrade / Repair Only	Fox Hill School	325 Students	3 classrooms / grade	Fox Hill Only
Option No. 2	Addition / Renovation	Fox Hill School	325 Students	3 classrooms / grade	Fox Hill Only
Option No. 3	New Construction	Fox Hill School	325 Students	3 classrooms / grade	Fox Hill Only
Option No. 4	Code Upgrade / Repair Only	Fox Hill School	640 Students	2 x 3 classrooms /grade	Combined Fox Hill & Pine Glen
Option No. 5	Addition / Renovation	Fox Hill School	640 Students	2 x 3 classrooms /grade	Combined FHES + PGES building with independent schools
Option No. 6	New Construction	Fox Hill School	640 Students	2 x 3 classrooms /grade	Combined FHES + PGES building with independent schools
Option No. 7	Addition / Renovation	Pine Glen School	640 Students	2 x 3 classrooms /grade	Combined FHES + PGES building with independent schools
Option No. 8	New Construction	Pine Glen School	640 Students	2 x 3 classrooms /grade	Combined FHES + PGES building with independent schools

Preliminary Design Program | Preliminary Space Summary

Program	Fox Hill Existing Conditions	Fox Hill Only @ MSBA Standards	General Comments
Core Academic	24,815 NFA	23,150 NFA	Includes general classrooms, STE classroom, ELL, literacy + math specialists, tutors
Special Ed.	4,485 NFA	15,225 NFA ¹	Includes LABBB program, DSC, SPED support spaces (SLP, BCBA, Learning Centers, Small Group / Reading, OT/PT, Quiet Rooms, Team Chair, Psychologist, Adjustment Counselor, etc.)
Art/Music	2,160 NFA	2,500 NFA	
Health & PE	4,170 NFA	7,300 NFA	Supports full size high school basketball court with additional run-off area and bleachers
Media Center	1,365 NFA	2,130 NFA	
Dining (Cafe, Kitchen, Stage, Teacher Dining)	6,610 NFA	5,567 NFA	
Medical / Admin	1,790 NFA	2,855 NFA	
Custodial / Main	860 NFA	1,925 NFA	
Other	0 NFA	0 NFA	
Sub Total Program	46,255 NFA	60,652 NFA	
Total Gross Sq. Ft. (GSF) (Gross SF / NFA = 1.5)	64,400 GSF	90,978 GSF	

Spatial Relationships | Fox Hill School Only



- Create optimum adjacencies between programs
- Classrooms clustered by grade
- Integrated student support
- Integrated Special Education
- Vertical and horizontal collaboration
- Zoned for after school / community use

LEGEND

- CORE ACADEMIC SPACES
- SPECIAL EDUCATION
- ART & MUSIC
- HEALTH & PHYS ED
- MEDIA CENTER
- AUDITORIUM / PLATFORM
- DINING & FOOD SERVICE
- MEDICAL
- ADMIN & GUIDANCE
- CUST, MAINT, & TOILETS
- CIRCULATION
- DIRECT PROGRAM CONNECTION
- PROGRAM AFFILIATION

Proposed Floor Plans | 2 Story School



Second Floor

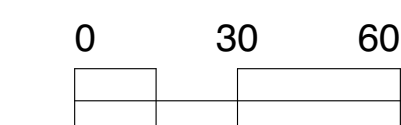


First Floor

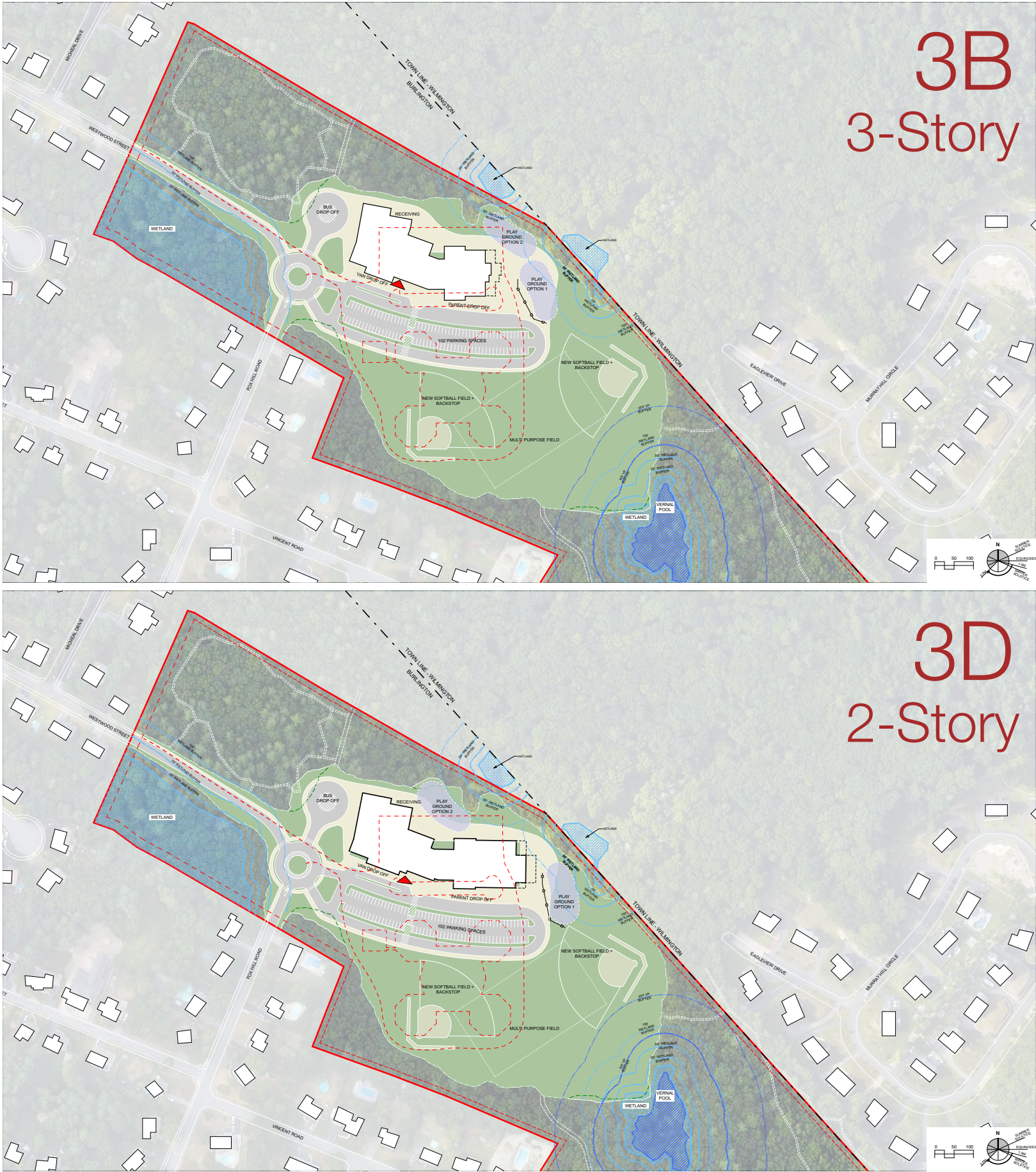
- 53,140 SF footprint
- 91,000 GSF (gross sq. ft)
- Academic Wing can be closed off from the Community Wing
- Music on first floor
- Media Center on second floor
- Art and STE on second floor
- Integrated LABBB and DSC
- Each grade “pod” includes two project areas and 4 classrooms
- Counseling Suite on second floor

LEGEND	
	CORE ACADEMIC SPACES
	SPECIAL EDUCATION
	ART & MUSIC
	HEALTH & PHYS ED
	MEDIA CENTER
	AUDITORIUM / PLATFORM
	DINING & FOOD SERVICE
	MEDICAL
	ADMIN & GUIDANCE
	CUST, MAINT, & TOILETS
	CIRCULATION

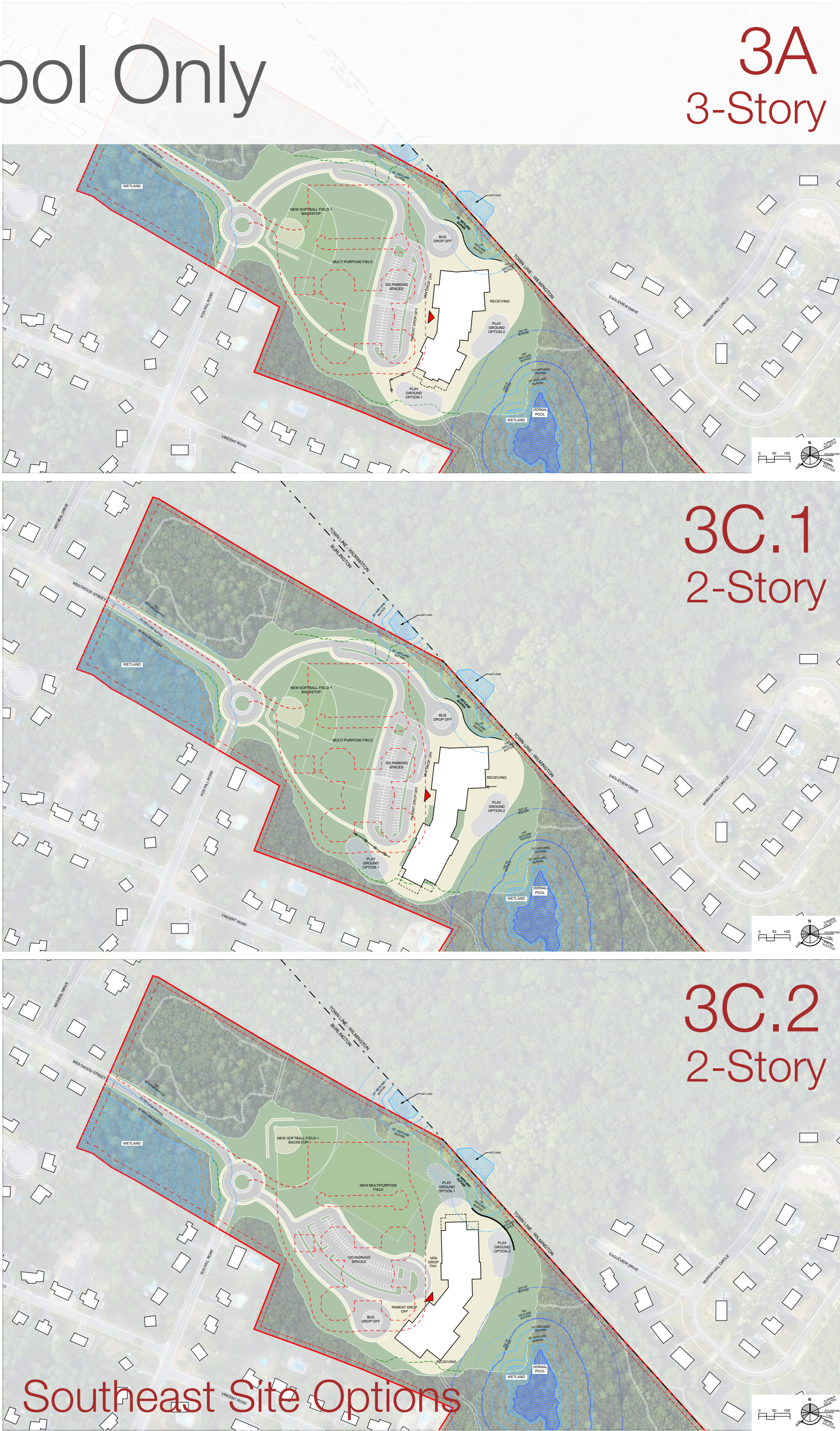
TM CR = Team Chair Conference Room
SLP = Speech Language Pathology
SM GRP = Small Group
ADJ CNLR = Adjustment Counselor
ESL = English Learners
PT = Physical Therapy
OT = Occupational Therapy
QT RM = Quiet Room
STE = Science Technology Engineering
CNLR = Counselor
BCBA = Board Certified Behavior Analyst
LAC = Staff Lactation Room
GUID/STOR = Guidance Office + Storage
CONF = Conference Room
T = Toilet
ECR = Elevator Machine Room
NET = Network Room
CUST = Custodian Closets / Storage



Evaluation of Alternatives | Fox Hill School Only



Northern Site Options



Southeast Site Options

Evaluation of Alternatives | Fox Hill School Only | 2-Story



- Project cost - \$99,168,000 (DBB*)
- Non-optimal east-west classroom orientation, slight increase in energy use in comparison to the north-south orientation
- Proposed building is 65 feet from vernal pool buffer
- Proposed building construction occurs at existing parking lot, 15 feet from existing occupied building
- 7' of unsuitable soils must be removed from within the building footprint
- Retaining walls required



- Project cost - \$97,243,000 (DBB*)
- Optimal north-south classroom orientation
- Proposed building is 470 feet from vernal pool buffer
- Proposed building construction occurs at existing parking lot, 85 feet from existing occupied building
- 4' of unsuitable soils must be removed from within the building footprint
- Retaining walls not required

* DBB = Design Bid Build

Evaluation of Alternatives | Fox Hill School Only | 2-Story



- Project cost - \$99,168,000 (DBB*)
- Non-optimal east-west classroom orientation, slight increase in energy use in comparison to the north-south orientation
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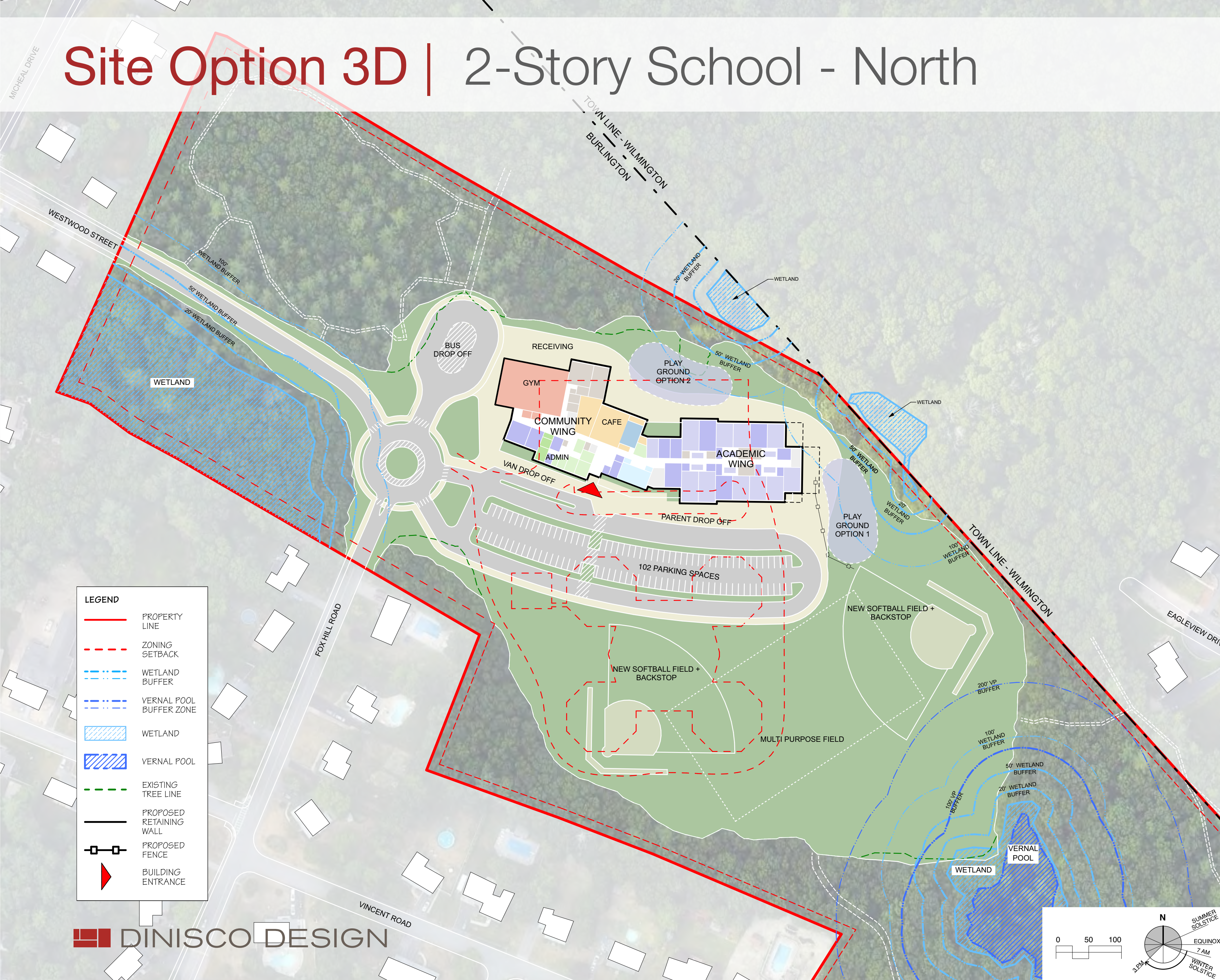


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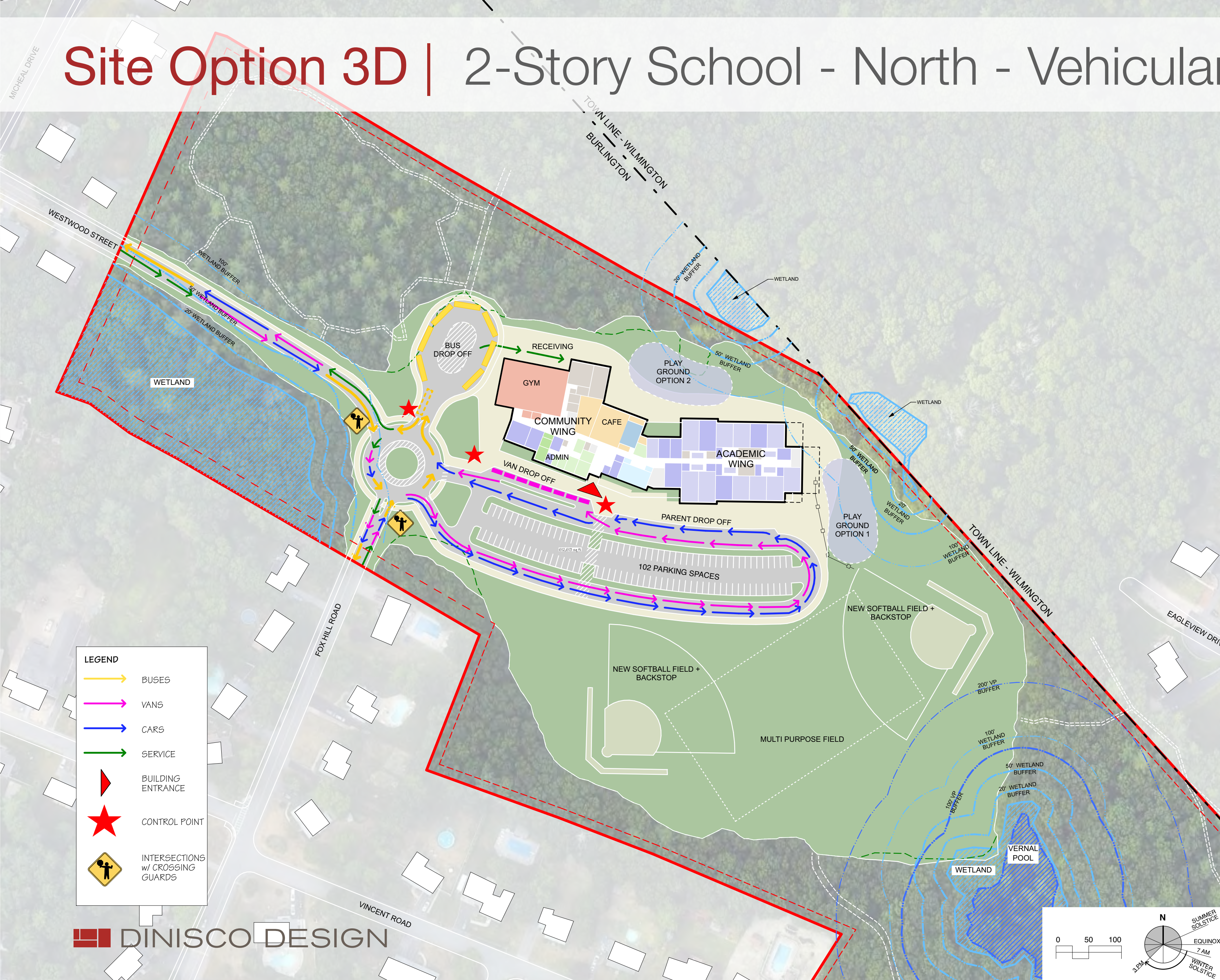
Site Option 3D | 2-Story School - North

- 53,140 SF footprint
- Additional roof area for PV
- Traffic circle at Westwood and Fox Hill streamlines traffic flow
- Bus and vehicular drop-off separated
- Parent queue length is 1,000 LF
- Far from vernal pool
- Optimal north-south classroom orientation
- Requires minimal paving
- Relatively flat development area

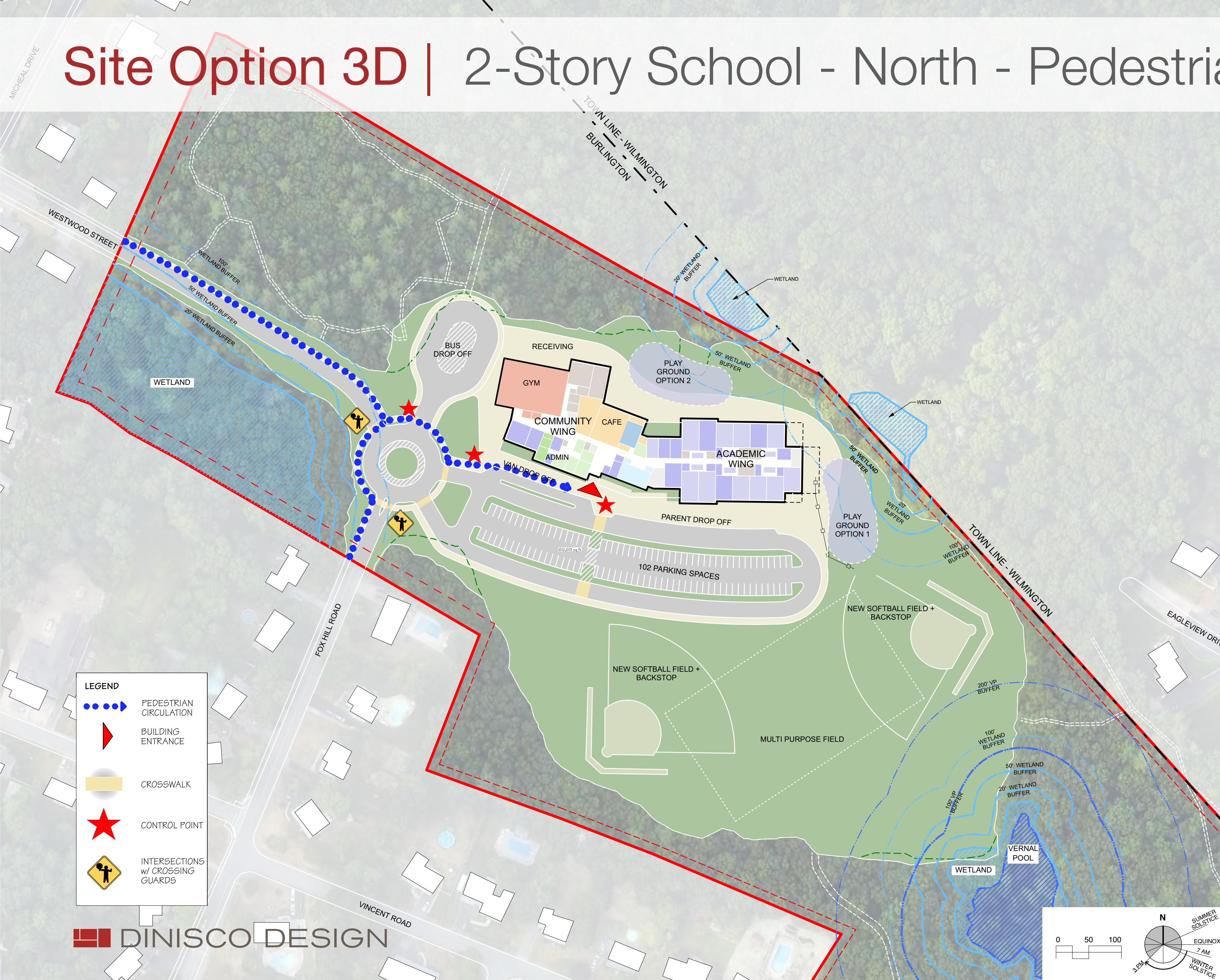


Site Option 3D | 2-Story School - North - Vehicular Circulation

- 53,140 SF footprint
- Additional roof area for PV
- Traffic circle at Westwood and Fox Hill streamlines traffic flow
- Bus and vehicular drop-off separated
- Parent queue length is 1,000 LF
- Far from vernal pool
- Optimal north-south classroom orientation
- Requires minimal paving
- Relatively flat development area

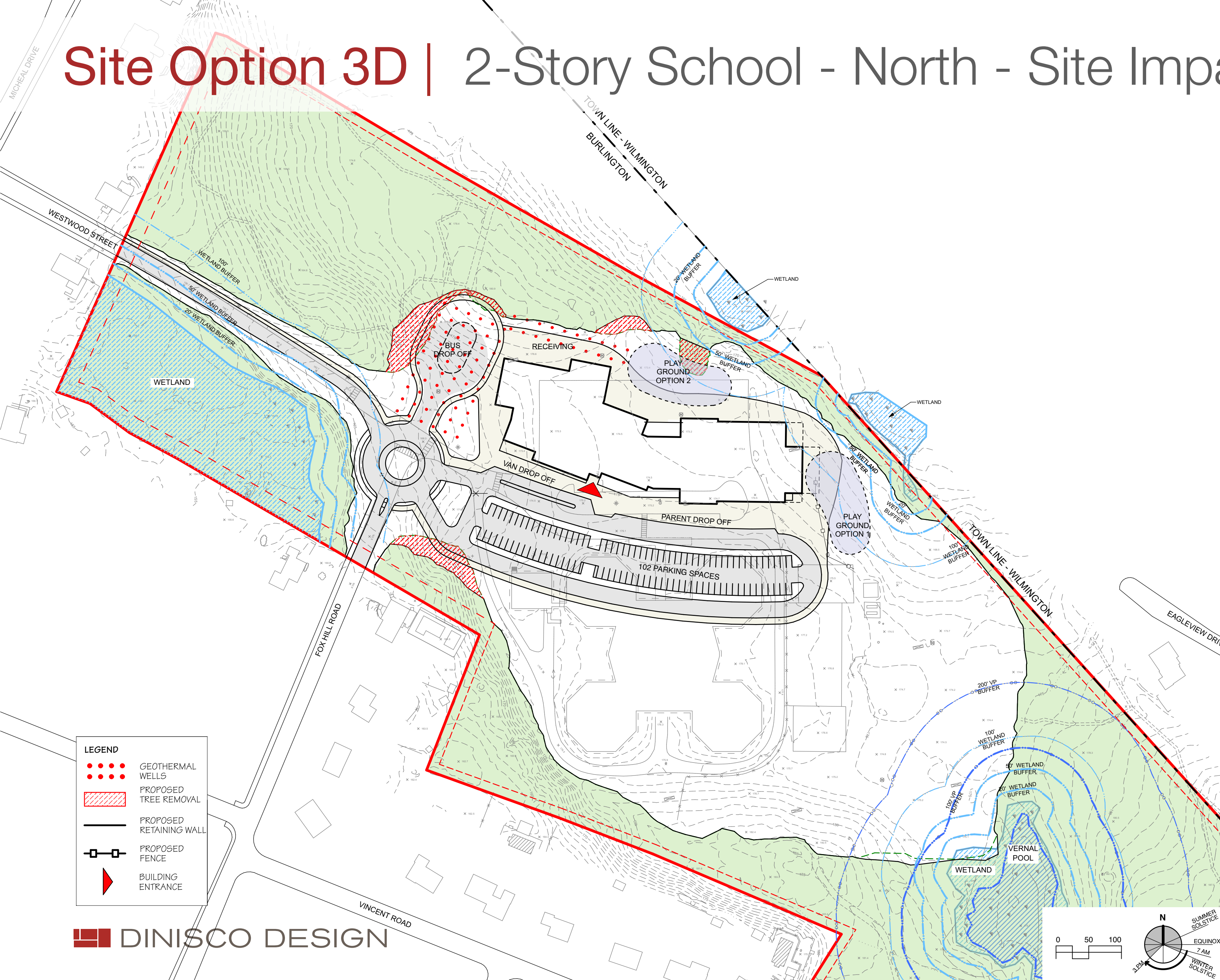


Site Option 3D | 2-Story School - North - Pedestrian Circulation



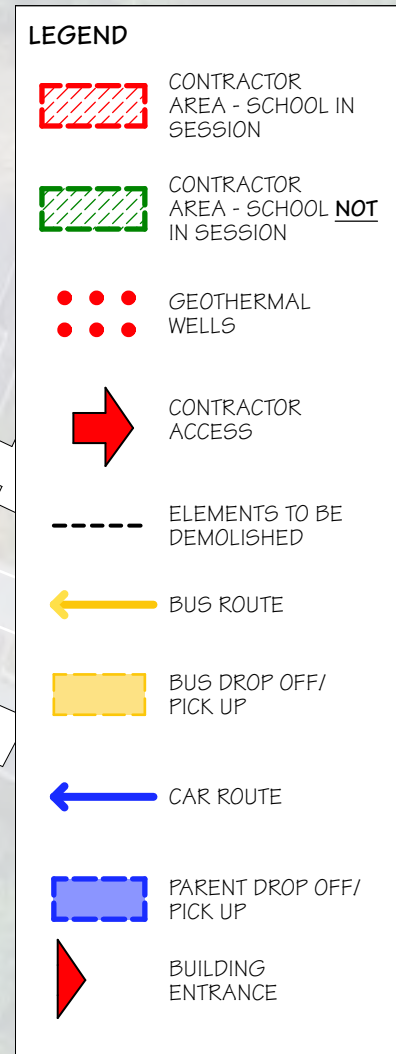
- 53,140 SF footprint
- Additional roof area for PV
- Traffic circle at Westwood and Fox Hill streamlines traffic flow
- Bus and vehicular drop-off separated
- Parent queue length is 1,000 LF
- Far from vernal pool
- Optimal north-south classroom orientation
- Requires minimal paving
- Relatively flat development area
- Pedestrian access via existing sidewalks from Westwood street and Fox Hill road
- Pedestrian access to school is clockwise around circle

Site Option 3D | 2-Story School - North - Site Impacts + Considerations



- Selective tree removal at northwest woodlands and south of the traffic circle
- Proposed building is 470 feet from vernal pool buffer
- Proposed building construction occurs at existing parking lot, 85 feet from existing occupied building
- 4' of unsuitable soils must be removed from within the building footprint
- Relatively high water table near traffic circle
- Relatively flat development area

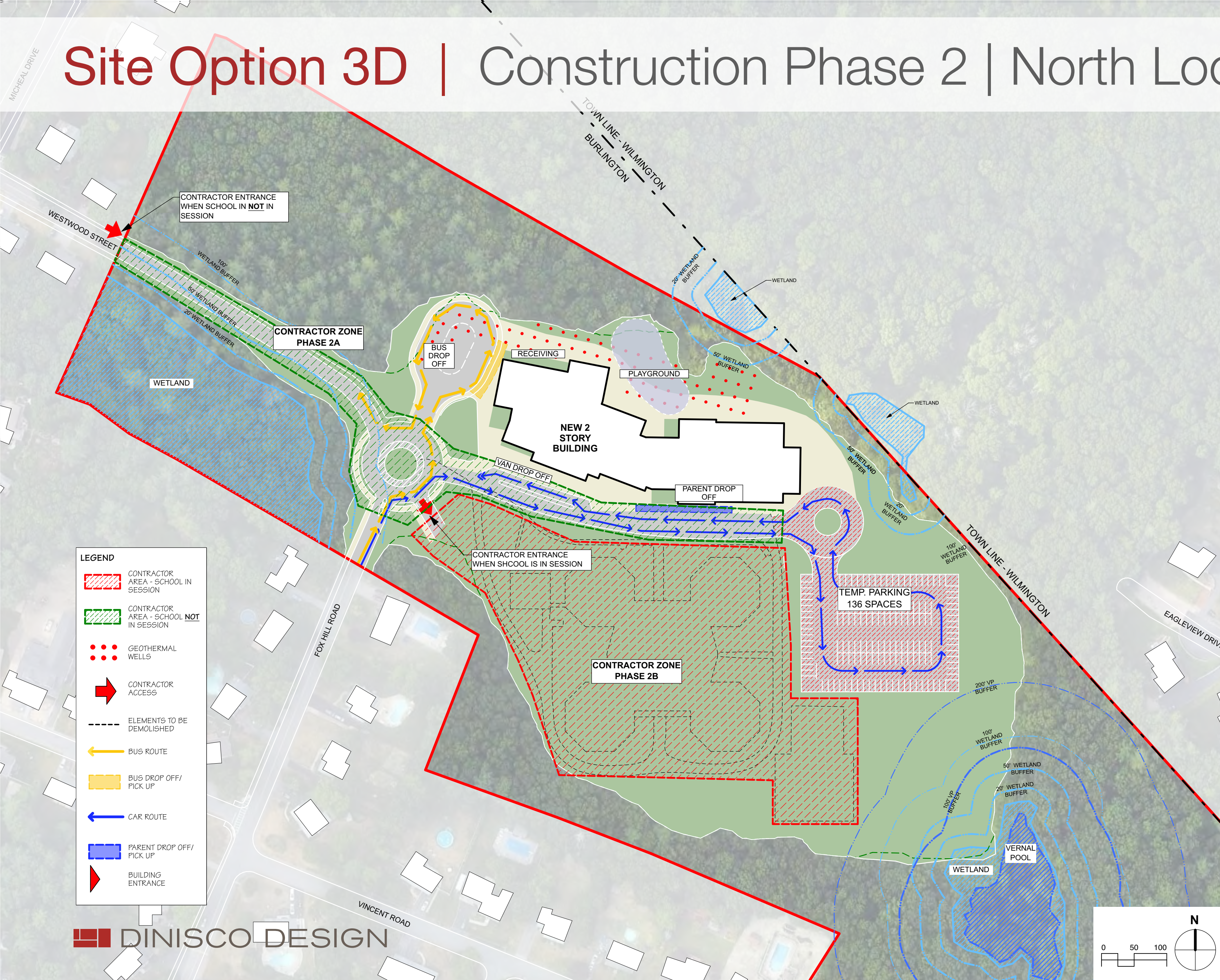
Construction Phase 1 | North Location



- Clear separation of school and construction zones
- Construction zone near site entrance
- Current parent drop-off remains during construction
- Temporary, separate bus drop off loop to be created
- Proposed building construction occurs at existing parking lot, 85 feet from existing occupied building
- Temporary parking required
- Temporary playground area required

Site Option 3D | Construction Phase 2 | North Location

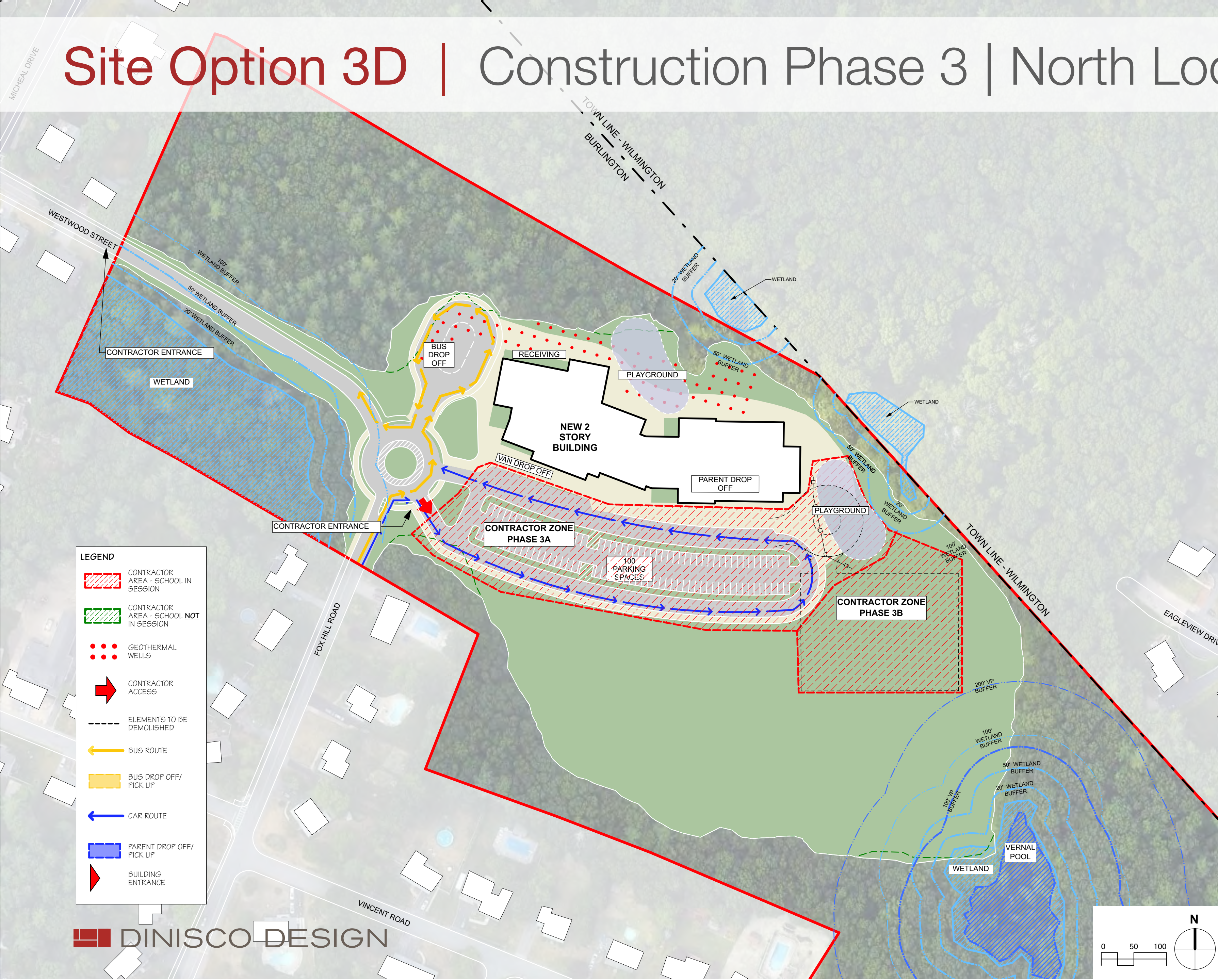
- Clear separation of school and construction zones
- Staff and students move into new building, playground complete
- New bus loop complete
- New parent drop-off with temporary loop
- Temporary parking to remain
- Fox Hill School is abated and demolished



LEGEND

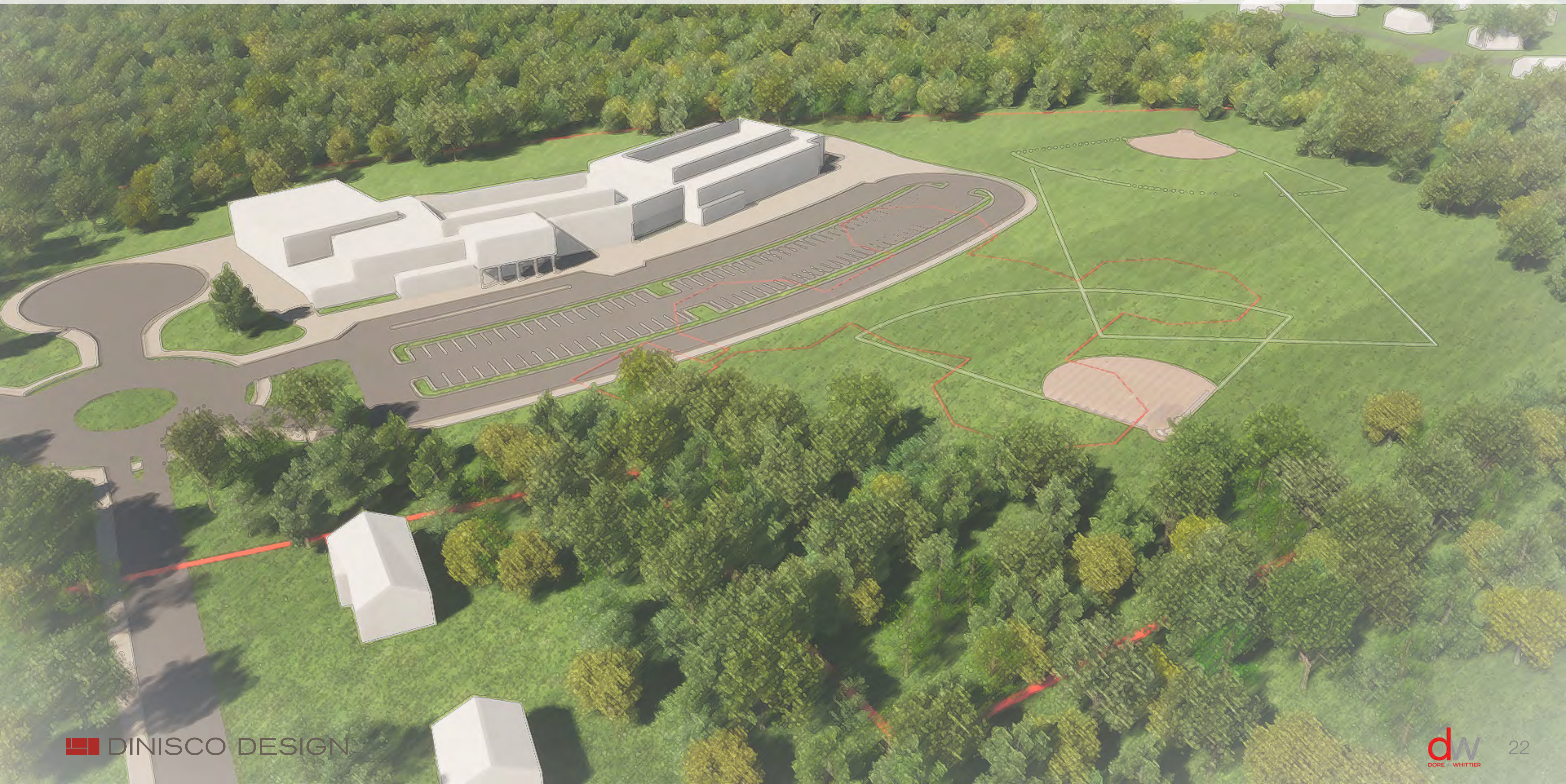
- CONTRACTOR AREA - SCHOOL IN SESSION
- CONTRACTOR AREA - SCHOOL NOT IN SESSION
- GEOTHERMAL WELLS
- CONTRACTOR ACCESS
- ELEMENTS TO BE DEMOLISHED
- BUS ROUTE
- BUS DROP OFF/ PICK UP
- CAR ROUTE
- PARENT DROP OFF/ PICK UP
- BUILDING ENTRANCE

Site Option 3D | Construction Phase 3 | North Location



- Clear separation of school and construction zones
- Staff and students move into new building, playground complete
- New bus loop complete
- New parent drop-off with temporary loop
- Temporary parking to remain
- Fox Hill School is abated and demolished
- Parking lot and drop-off are completed
- Fields are completed

Site Option 3D | 2-Story School - North - Preliminary Massing



Sustainability Goals and Priorities

- Net zero energy
- Rooftop solar panels
- All electric building
- Ground source heat pumps (GSHP) (aka geothermal)
- Further study for Rainwater Harvesting



Sustainability Goals and Priorities | Mechanical Options Studied

	Central Plant	Air Distribution Side
VAV Gas	Gas boilers, air-cooled chiller	VAV with reheat
VRF	Air source VRF outdoor condensing units	ERV with air source VRF fan coil units
ASHP+FCU	Air source heat pump with electric boiler backup	ERV with fan coil units
GSHP+ACB	Ground source heat pump	ERV with chilled beams
GSHP+FCU	Ground source heat pump	ERV with fan coil units
GSHP+DV	Ground source heat pump	Displacement ventilation
GSHP+VRF	Ground source heat pump	ERV with water source VRF indoor units

Energy Incentives | MassSave

Incentives available for projects with low EUI (≤ 25) and high-efficiency electric heating/cooling equipment

MassSave Incentive Path 1:

K-12 Schools	Site EUI Range	Incentives				
		Payable at end of Construction		Payable at end of 1 yr. post occupancy		
		Construction Incentive \$/sf	Heat Pump Adder*	Post Occ. Inc. \$/sf	Adder for getting under ZNE EUI target	Certification Incentive
Tier 2 (high schools only)	26-29	\$1.50	Air Source Heat Pumps: \$800/ton		Not applicable	
Tier 1 - Net Zero Level (all Schools)	25 or less	\$2.00	Variable Refrigerant Flow (VRF): \$1200/ton Ground Source Heat Pumps: \$4500/ton	\$ 1.50	\$0.05/EUI point reduction/sf	\$3,000

*Additional revenue potentially available through the Inflation Reduction Act (IRA). Tax credits available for alternative energy and high-efficiency electric equipment like ground source heat pumps (GSHP)

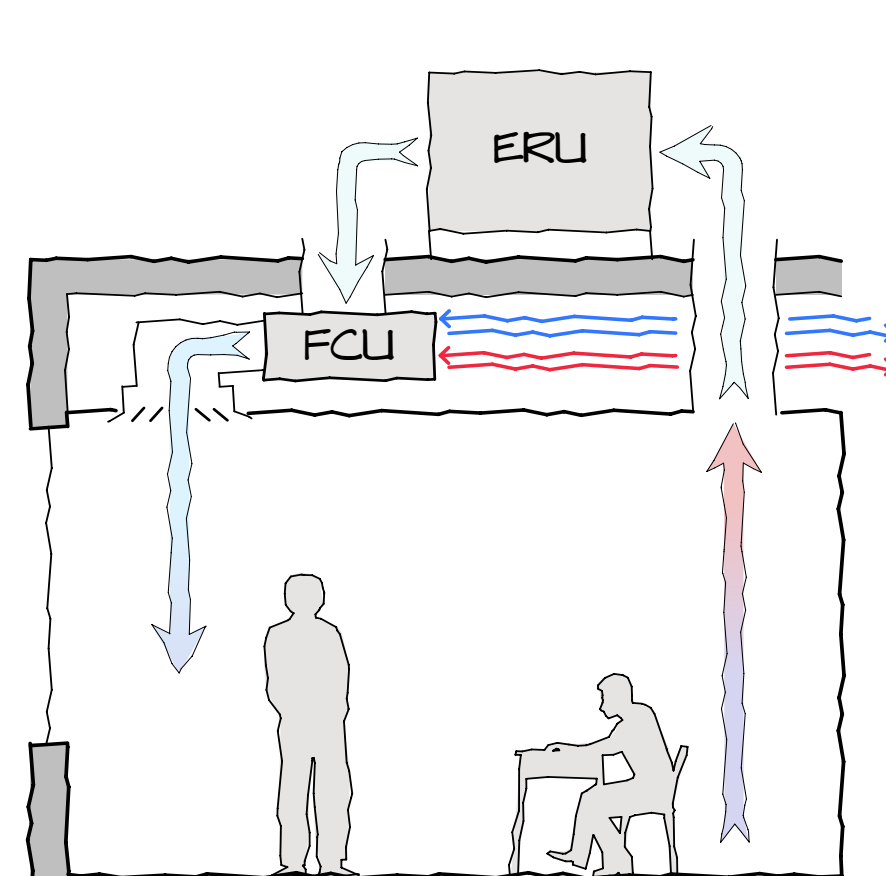
Sustainability Goals and Priorities | Life Cycle Cost Analysis Summary (Option 3D)

System Type	EUI (kBtu/ft ² /yr)	First Cost Before Incentives (\$)	- MassSave Construction Incentives ¹ (\$)	- MassSave Occupancy Incentives ² (\$)	- IRA Tax Credits ³ (\$)	+ Annual Operating Cost (\$)	+ Replacement Cost <i>Net Present Cost</i> (\$)	= 50 yr Life Cycle Cost <i>Net Present Cost</i> (\$)	= Relative LCC compared to VAV Gas <i>Net Present Cost</i> (\$)
VAV Gas	30.6	\$10,732,506	\$0	\$0	\$0	\$115,599	\$24,774,243	\$44,026,868	\$0
VRF	25.3	\$9,241,193	\$486,428	\$130,821	\$0	\$124,483	\$27,529,186	\$45,328,035	\$1,301,168
ASHP+FCU	24.5	\$10,451,068	\$382,428	\$130,821	\$0	\$120,942	\$24,124,589	\$42,976,328	-\$1,050,540
GSHP+ACB	23.2	\$13,630,294	\$1,344,428	\$130,821	\$4,089,088	\$114,103	\$22,452,857	\$38,928,671	-\$5,098,197
GSHP+FCU	23.3	\$13,376,069	\$1,344,428	\$130,821	\$4,012,821	\$114,788	\$21,957,806	\$38,306,150	-\$5,720,718
GSHP+DV	24.1	\$13,244,231	\$1,344,428	\$130,821	\$3,973,269	\$118,758	\$21,701,079	\$38,249,742	-\$5,777,126
GSHP+VRF	22.1	\$13,448,319	\$1,344,428	\$130,821	\$4,034,496	\$108,790	\$22,098,498	\$38,055,340	-\$5,971,528

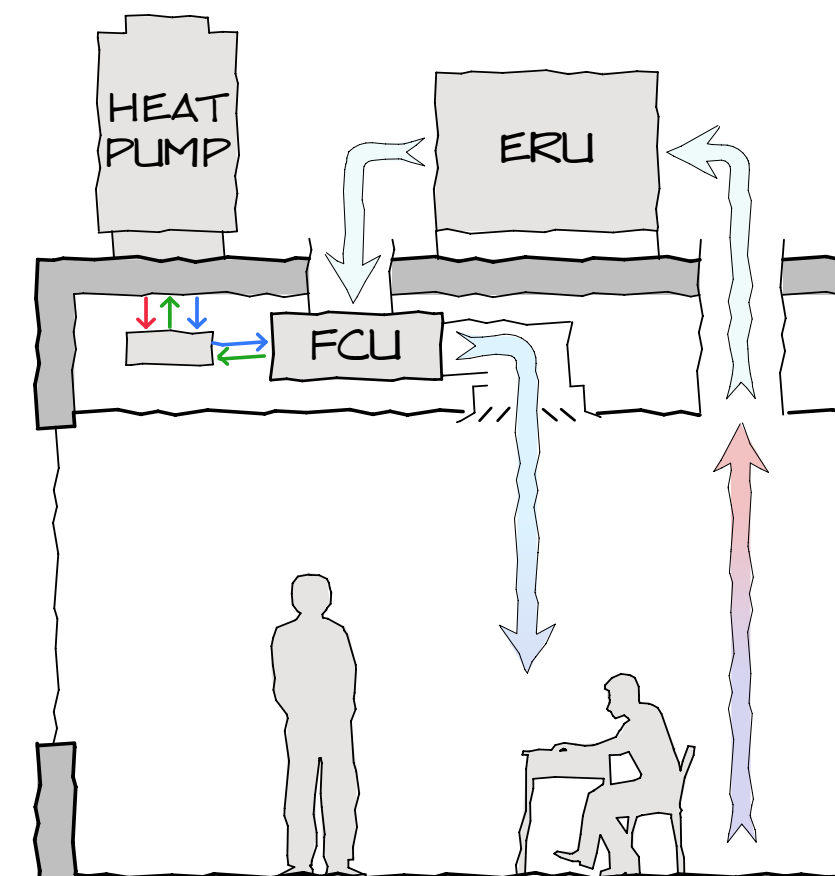
1. All options below EUI 25.4 kBtu/ft²/yr: Pathway 1 (\$2/ft² + HP adder)
2. \$1.25/ft² for post occupancy if measured EUI meets target
3. The 30% Inflation Reduction Act (IRA) federal tax credit for GSHP is an approximation. Burlington will need to work with a tax attorney to confirm and secure the federal tax credits
4. Incentives and EUI are based on feasibility 2-story configuration conditioned floor area of 87,000 ft²
5. It is assumed the systems will be maintained by the same in-house maintenance crew that the school department already pays salaries for. Therefore, maintenance costs have not been added.

Sustainability Goals and Priorities | Decisions to be Made

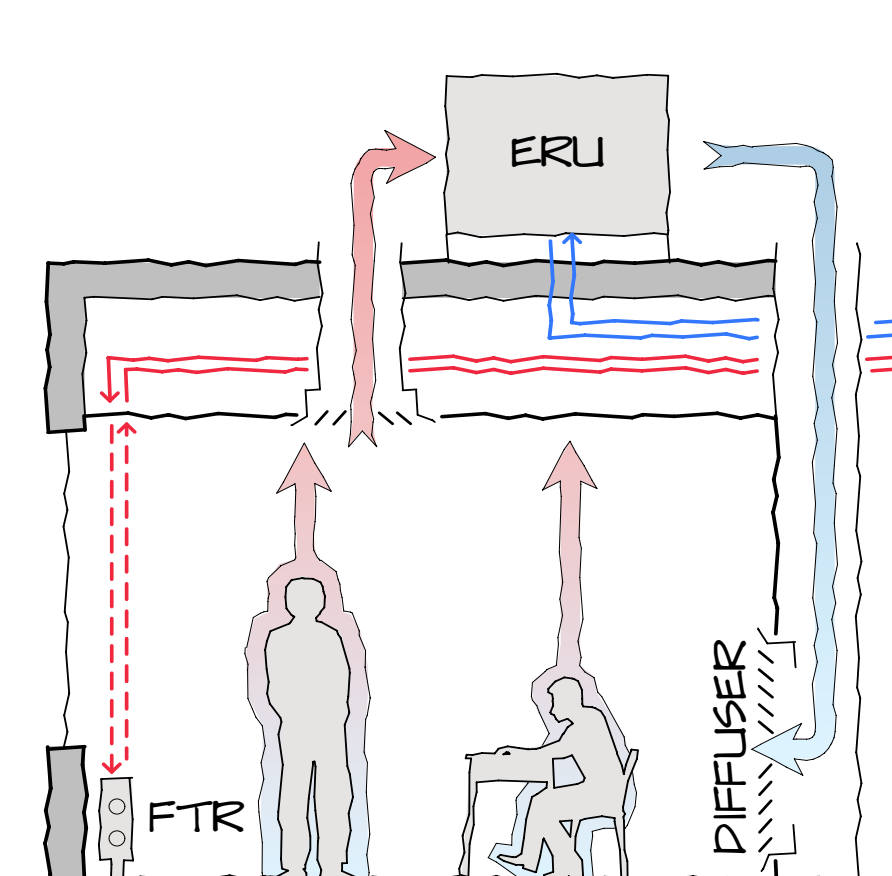
- All Electric - November 2023
- GSHP vs ASHP vs VRF - November 2023
- Distribution System – February 2024
- Further study for Rainwater Harvesting in Schematic Design



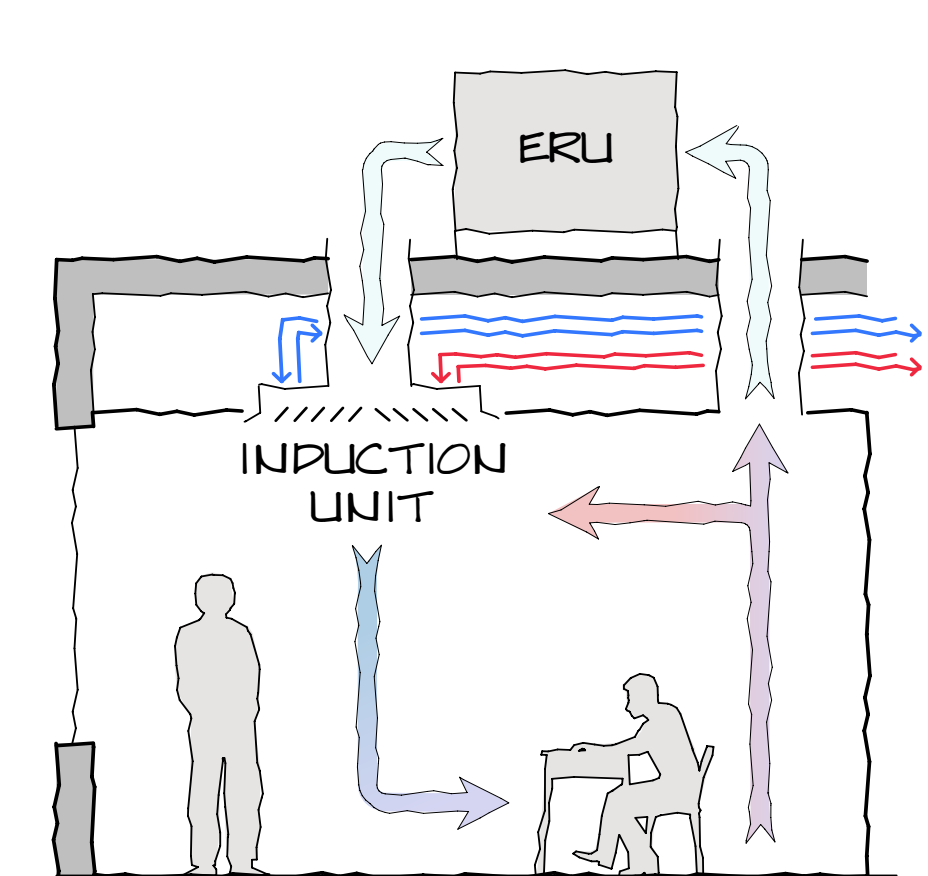
Fan Coil Units (FCU)



Variable Refrigerant Flow (VRF)



Displacement Ventilation



Induction Units (Chilled Beam)

PSR Pricing and Budget

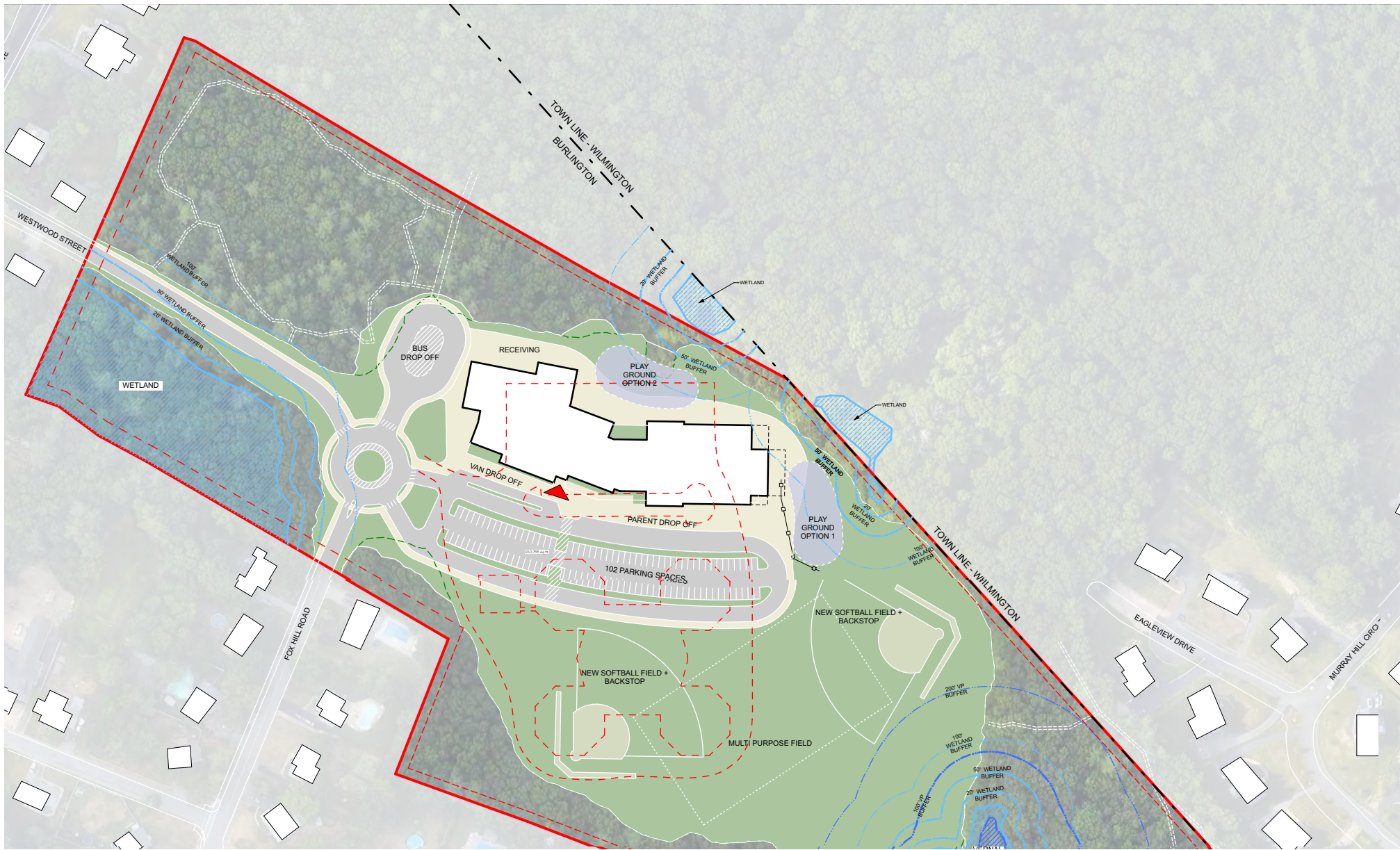
MSBA Preferred Schematic Construction Budget

- Cost comparison to evaluate alternatives
- Preliminary design pricing
 - Defines general building elements including town requirements
 - Defines general site work including town requirements
- PSR budget is the basis of design, design has not occurred
- Cost estimates reflect MSBA / public K-12 school construction standards

Total Project Budget

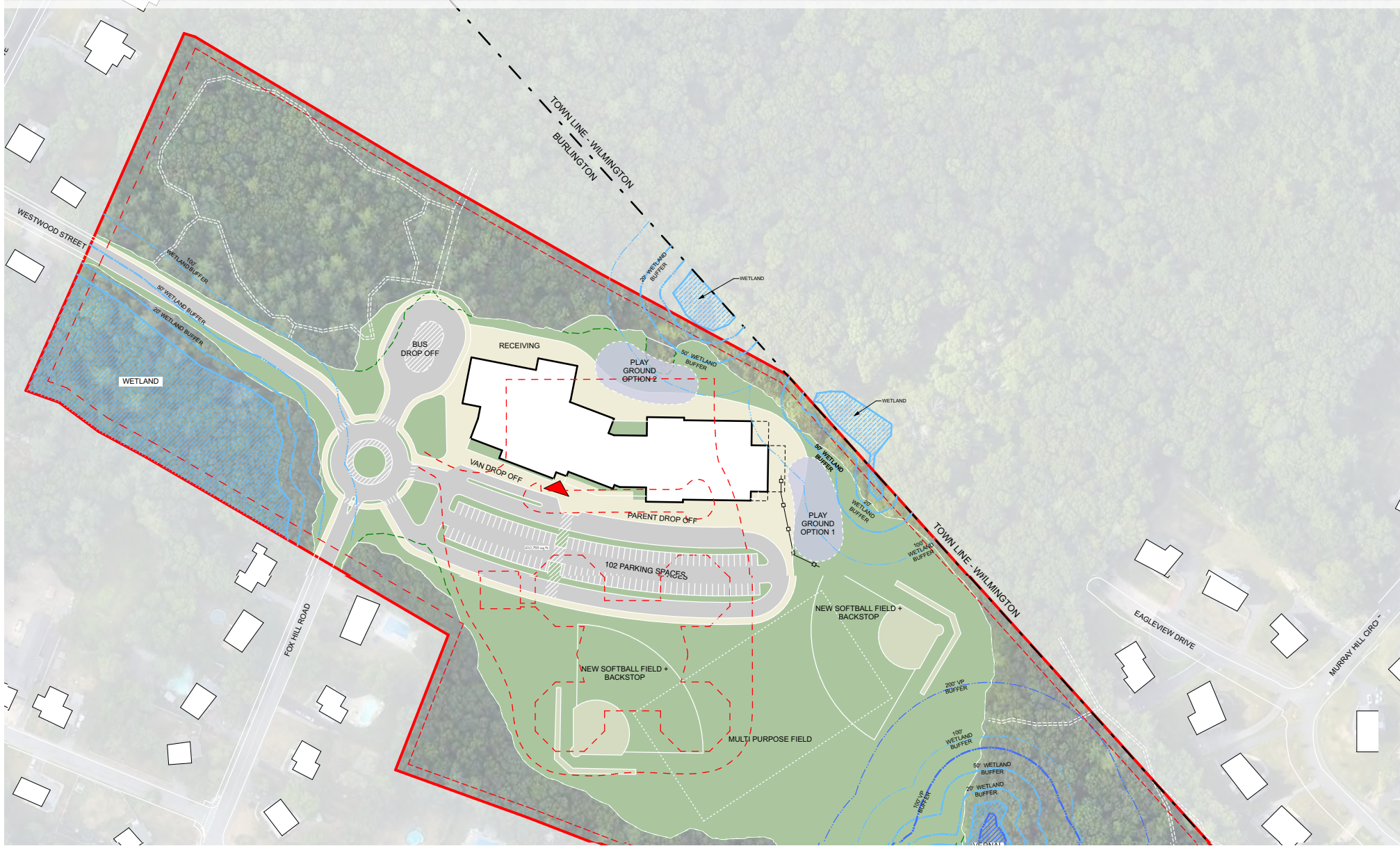
- Preliminary construction and soft costs
- Preliminary MSBA reimbursement
- Preliminary town share of project

Evaluation of Alternatives | Construction Cost Comparisons



Option 3D Northern Site Location New 2-story 91,000 SF		
Construction Method	CMR (149a)	Design-Bid-Build (149)
Total Construction w/ Base VAV + Gas Boilers	\$78,964,100	\$74,239,600
Add for GSHP + FCU (fan coil units)	\$2,791,602	\$2,707,854
Total Construction Cost	\$81,755,702	\$76,947,454
GSHP IRA + Incentives	-\$5,488,070	-\$5,488,070
Adjusted Total Construction Cost	\$76,267,632	\$71,459,384

Evaluation of Alternatives | Project Cost Comparisons

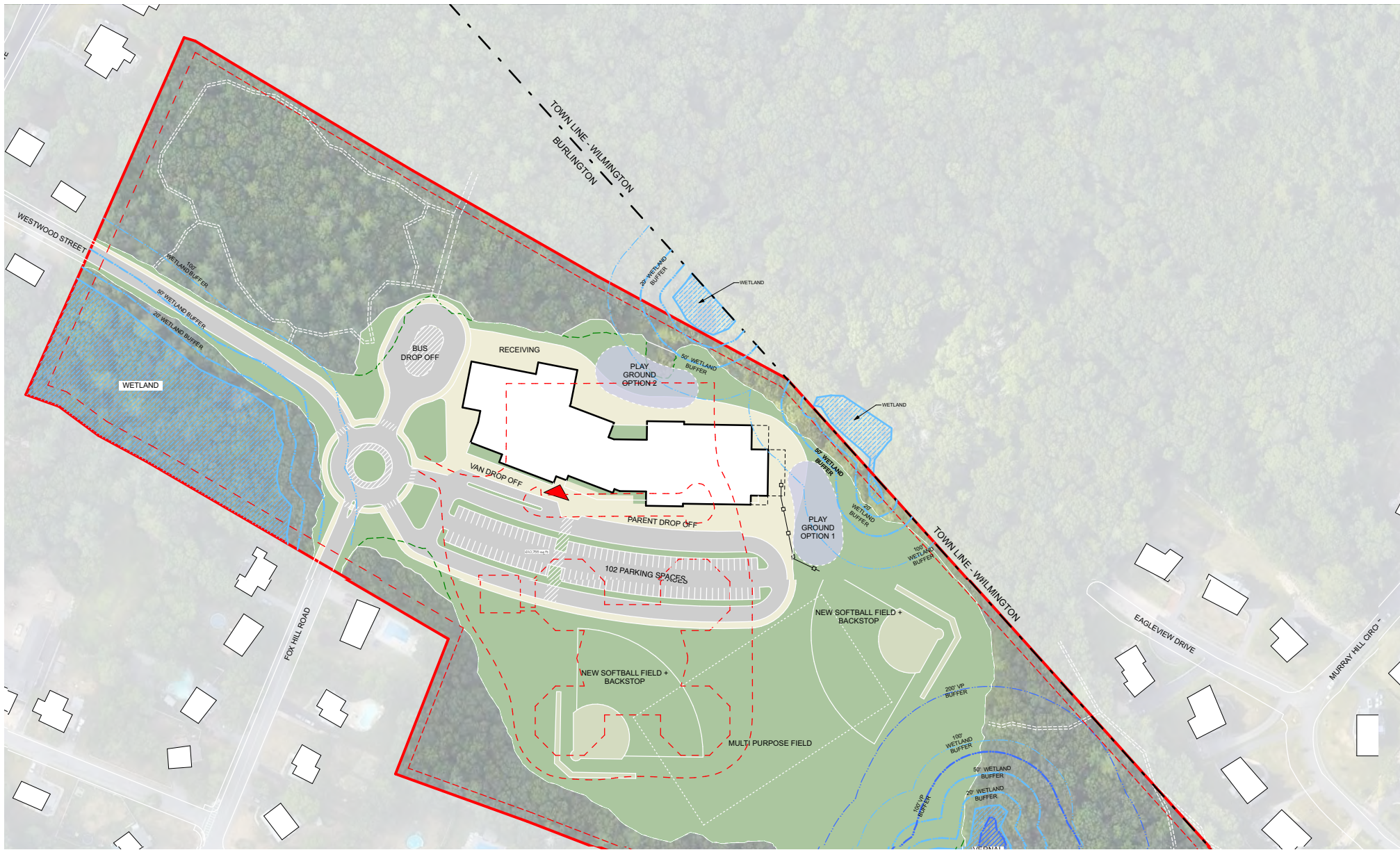


Option 3D Northern Site Location New 2-story 91,000 SF		
Construction Method	CMR (149a)	Design-Bid-Build (149)
Total Project Costs	\$103,160,368	\$97,243,120
Estimated MSBA Grant	\$33,126,832	\$33,026,392
Estimated Local Share	\$70,033,536	\$64,216,728
GSHP IRA + Incentives	-\$5,488,070	-\$5,488,070
Adjusted Local Share after Rebates	\$64,545,466	\$58,728,658

Total project costs include:

- OPM/Designer fees
 - Town agency reviews
 - Hazardous materials abatement
- Utility fees
 - Administrative costs
 - Furniture & Equipment
 - Technology
- Moving
 - Contingencies
 - Construction testing / oversight for structural, soils, geotechnical, demolition, etc.

Evaluation of Alternatives | Project Cost Comparisons

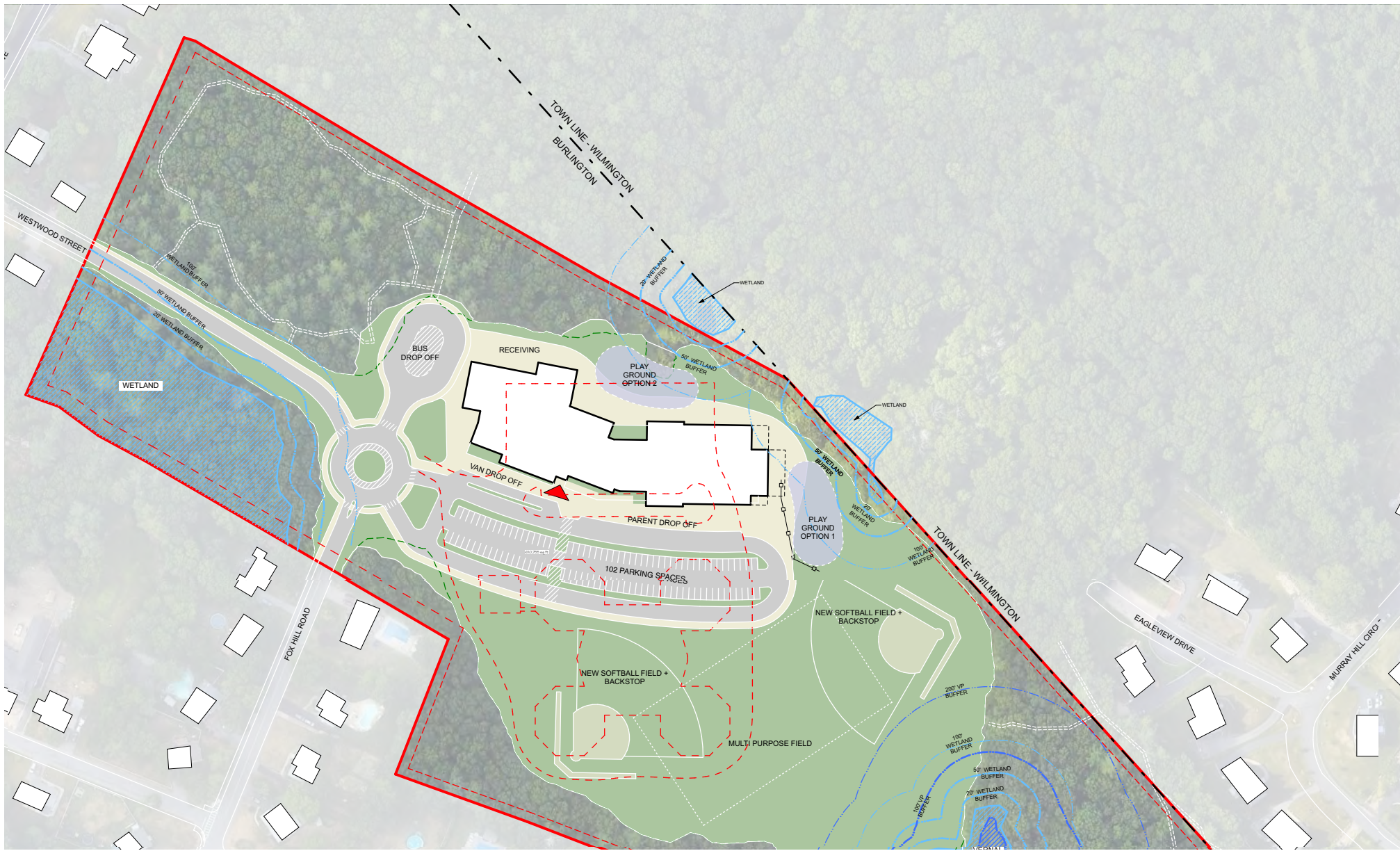


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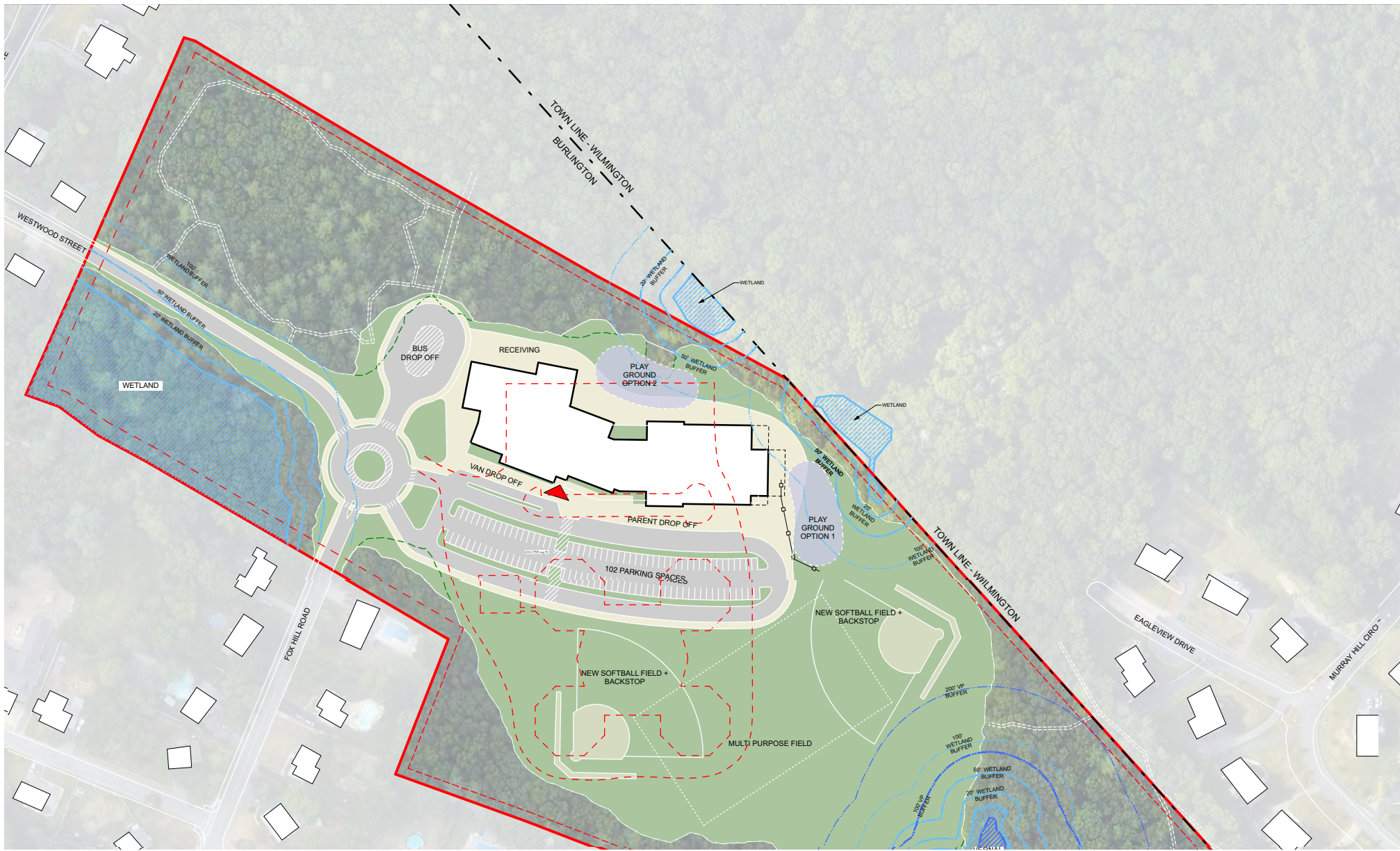
Evaluation of Alternatives | Ways and Means Projected Taxpayer Impact



- Ways and Means applied the current debt and tax calculators to the cost data provided by the OPM for the remaining options.
- Assumed a 25 year bond with a 5% rate and level payments. The actual timing and rates will vary, but these estimates provide a realistic expectation

	Option 3D Northern Site Location New 2-story 91,000 SF	
Construction Method	CMR (149a)	Design-Bid-Build (149)
Adjusted Local Share after Rebates	\$64,545,466	\$58,728,658
Debt service cost per year	\$4,700,000	\$4,300,000
Resident's average tax increase/year	\$212	\$194

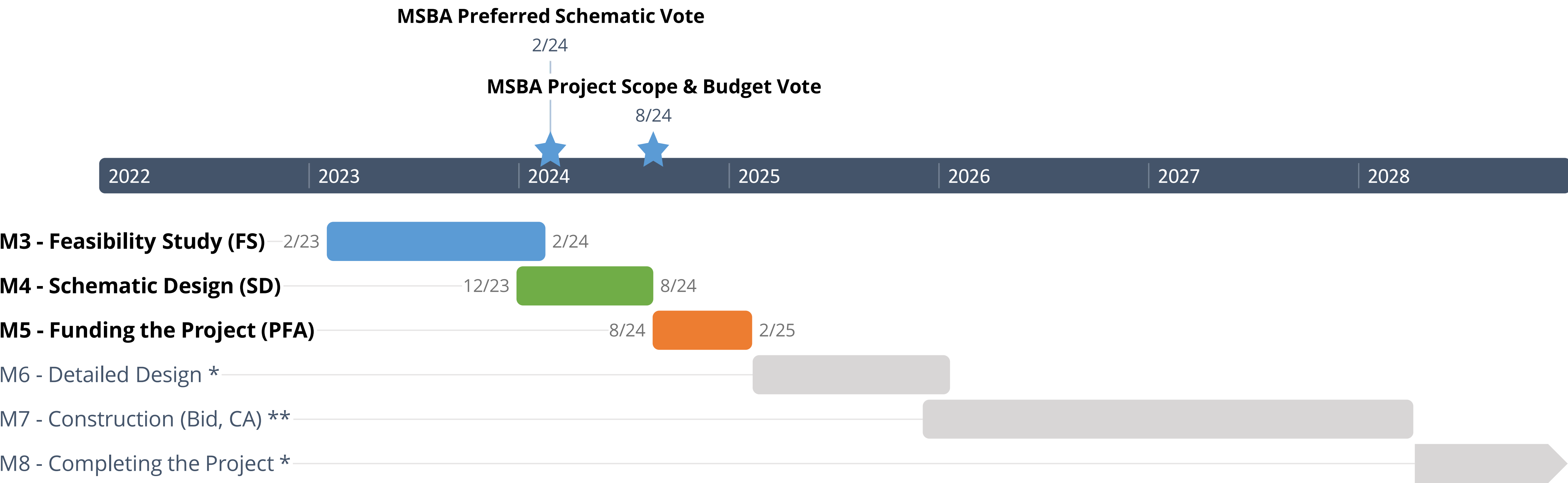
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Debt service cost per year	\$4,700,000	\$4,300,000
Resident's average tax increase/year	\$212	\$194

Project Schedule | Overall Project Timeline



**** All dates are approximate. Durations/dates for Modules 6 through 8 are subject to change depending on the preferred solution identified as a result of the preferred option/feasibility study process.***

***** Module 7 duration as indicated is approximate and includes the range of remaining options being studied in the PSR/Feasibility Phase (vary, approx. 28 – 30 months)***

Project Schedule | Key Dates

- School Building Committee Meeting December 18, 2023
 - ▶ Vote to submit Preferred Schematic Report
- Submit Preferred Schematic Report (PSR) December 21, 2023
- MSBA Board Meeting February 28, 2024
 - ▶ MSBA Vote to proceed into Schematic Design

Community Engagement | Public Comment / Q&A Conversation

Housekeeping Notes:

- Please state your name
- Please raise your hand to speak
- Please respect the three minute time limit to speak
- If remote, please post your comment / question in the chat

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Community Forum

BURLINGTON ELEMENTARY SCHOOL

Burlington, MA

December 05, 2023
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