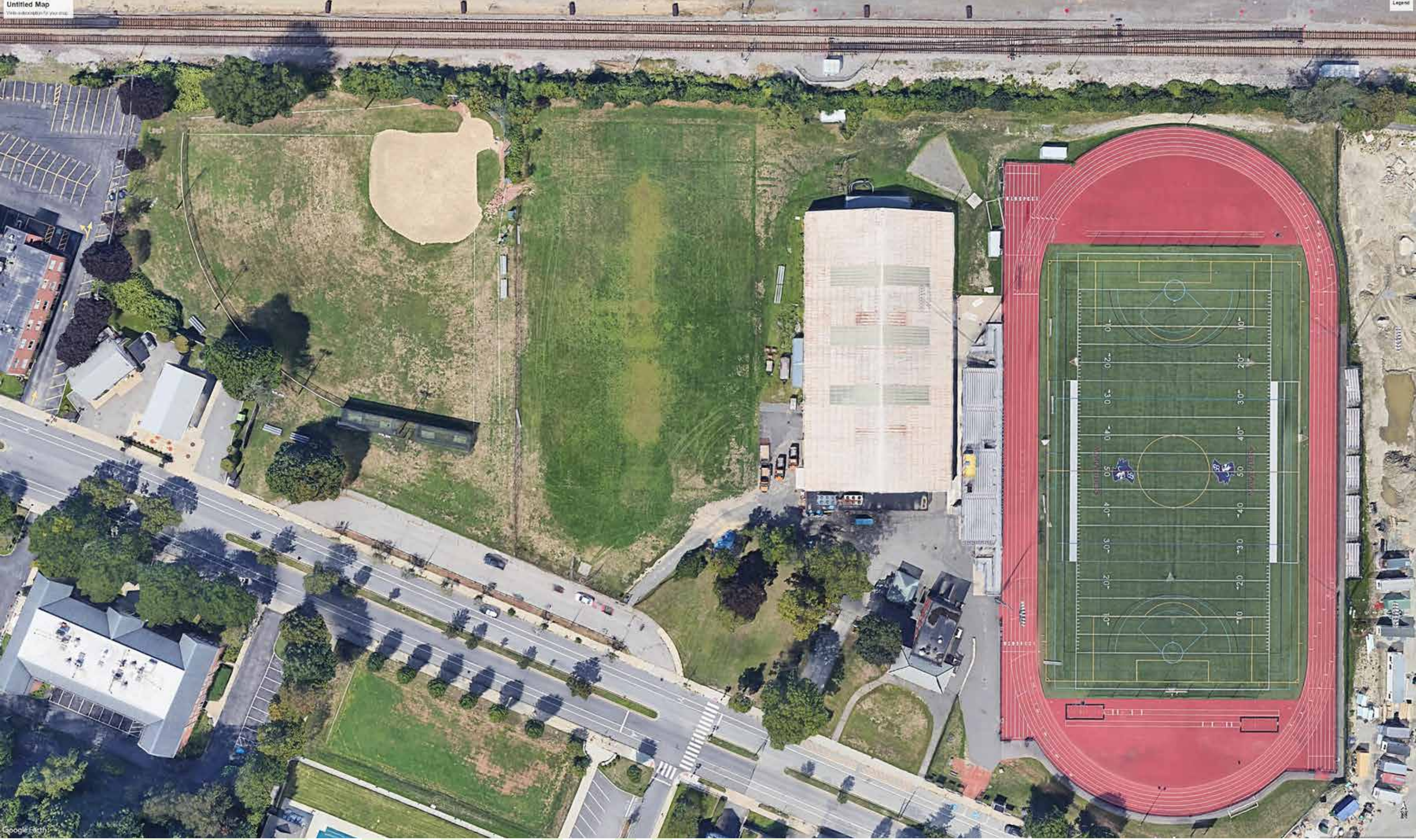
Belmont Skating Rink

Schematic Design

January 18th, 2023



AERIAL VIEW

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Current Day Belmont Skating Rink

CURRENT STATE

Existing Site Plan

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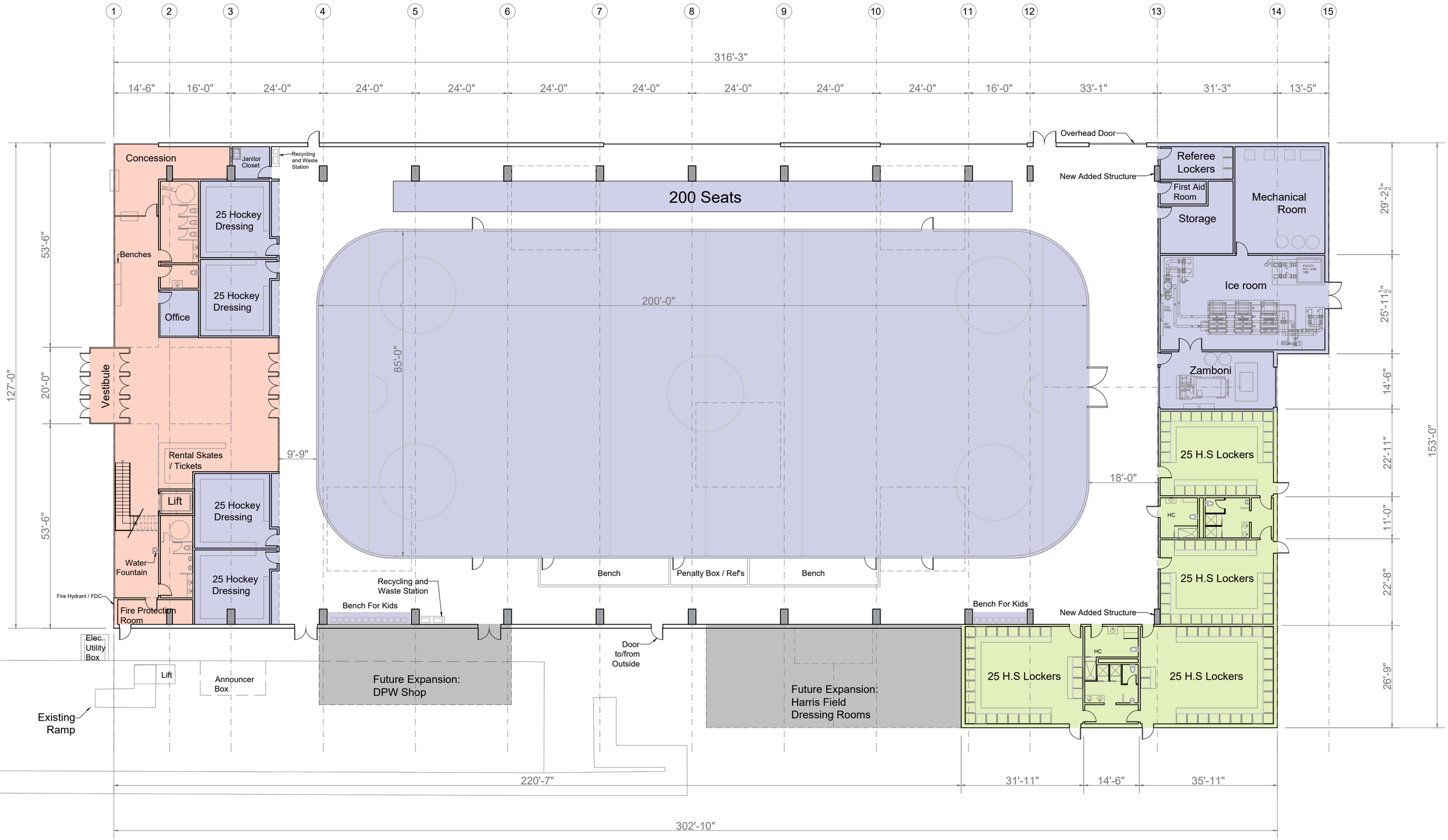

PROPOSED

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November 2022 - Proposed Floor Plan ± 41,464 sf

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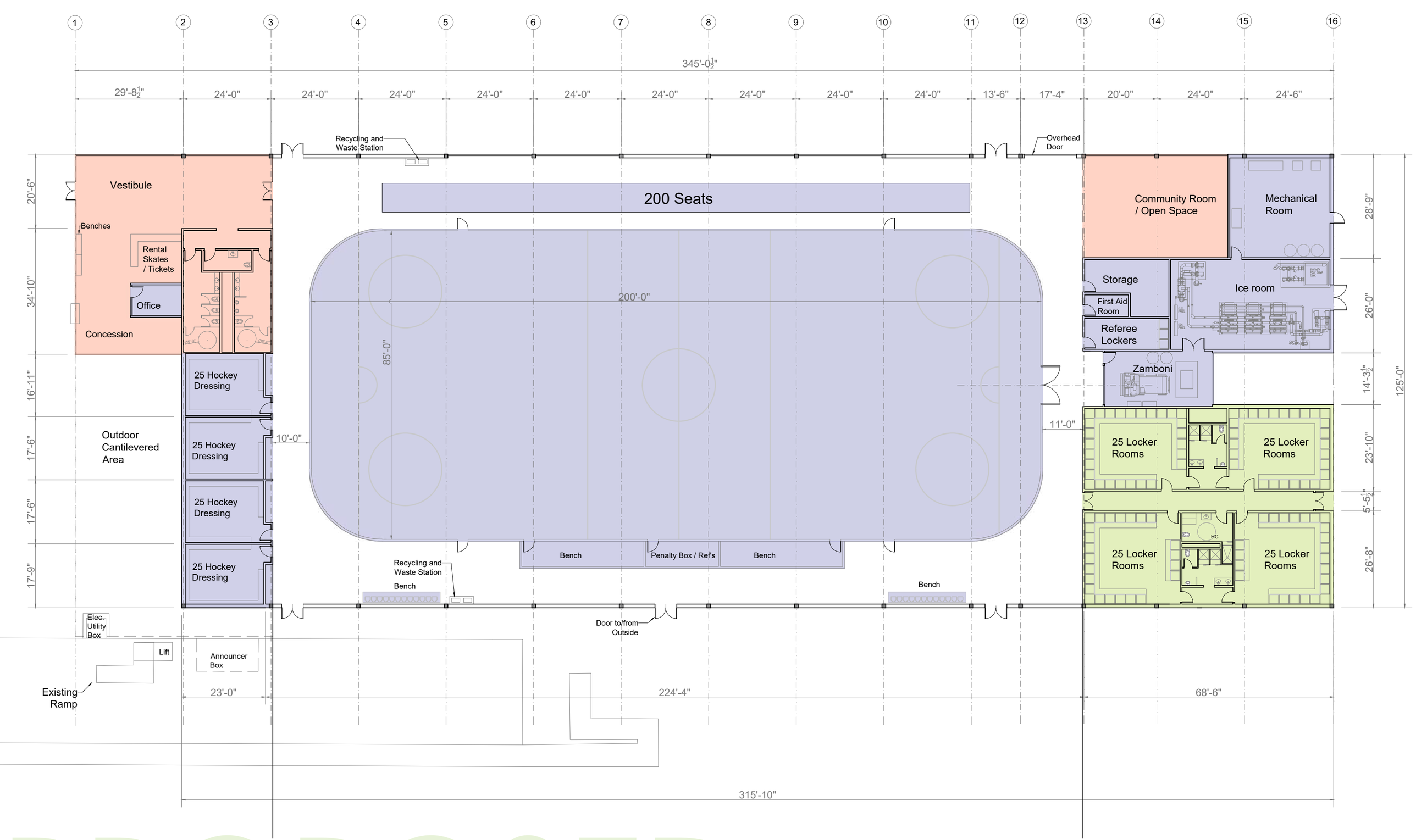

PROPOSED

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January 2023 - Proposed Floor Plan ± 40,627 sf

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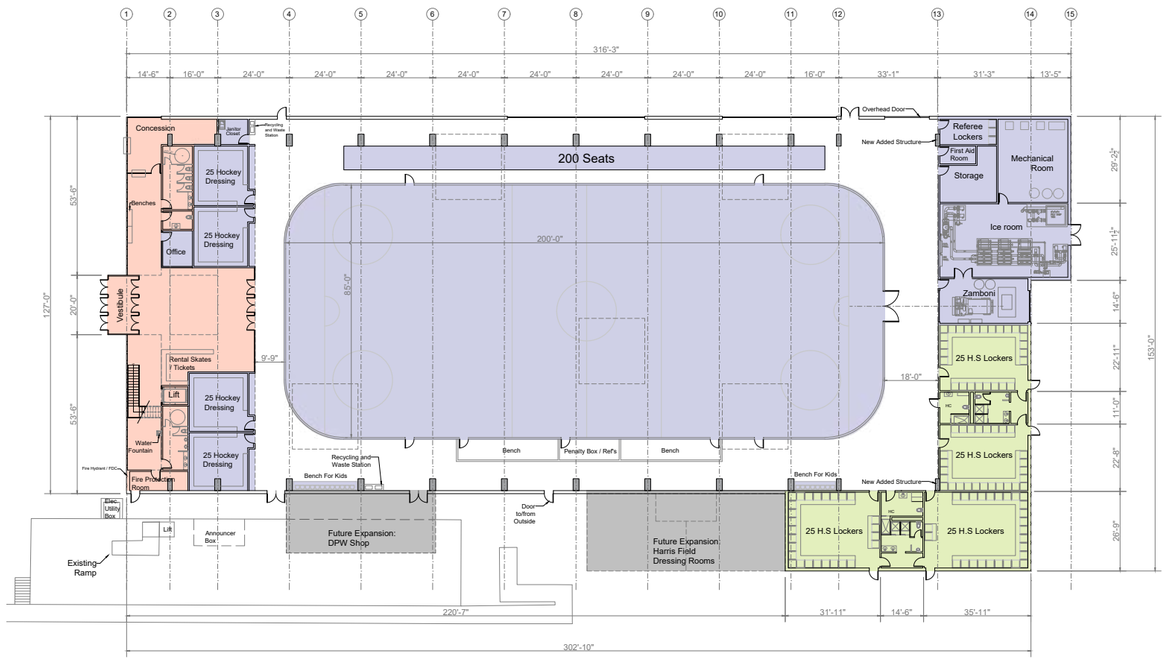

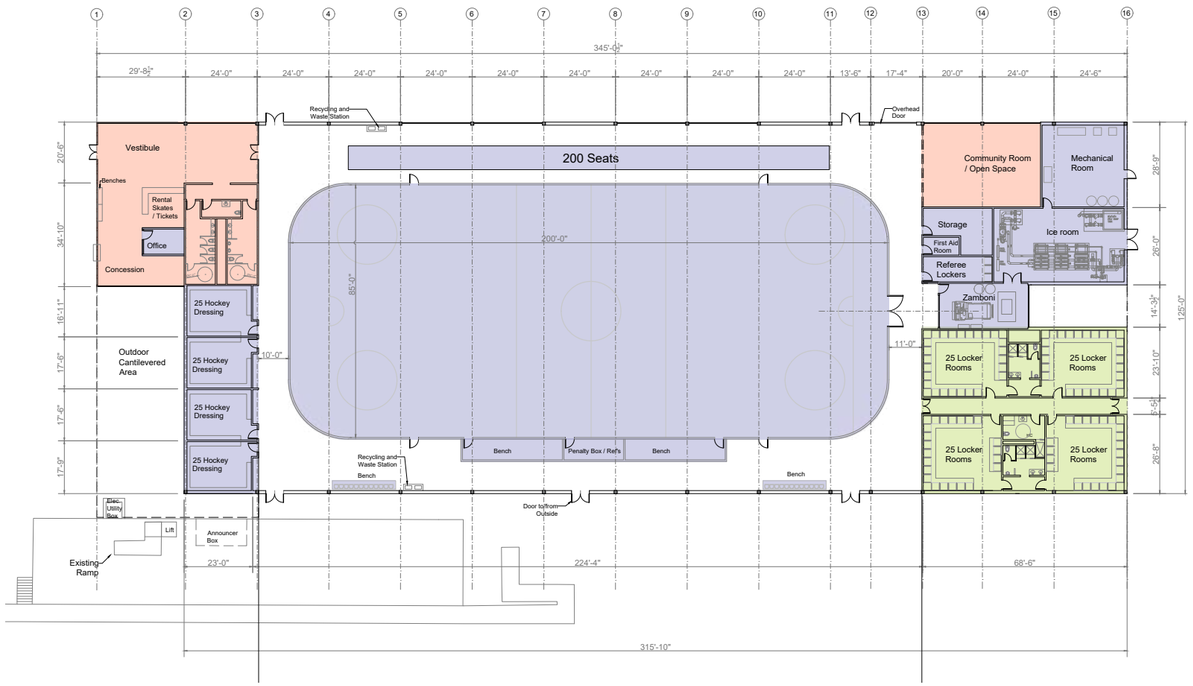

November 2022 Proposal

41,464sf @ $628/sf
= $26,039,392

January 2023 Proposal 2

40,627sf @ $628/sf *
= $25,513,756

* application of $628/sf ?

COMPARISON

Current Savings = ± $525,636
(Not yet including PV of $2.1 million)

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PROPOSED

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Proposed Site Plan - Keeping WFH

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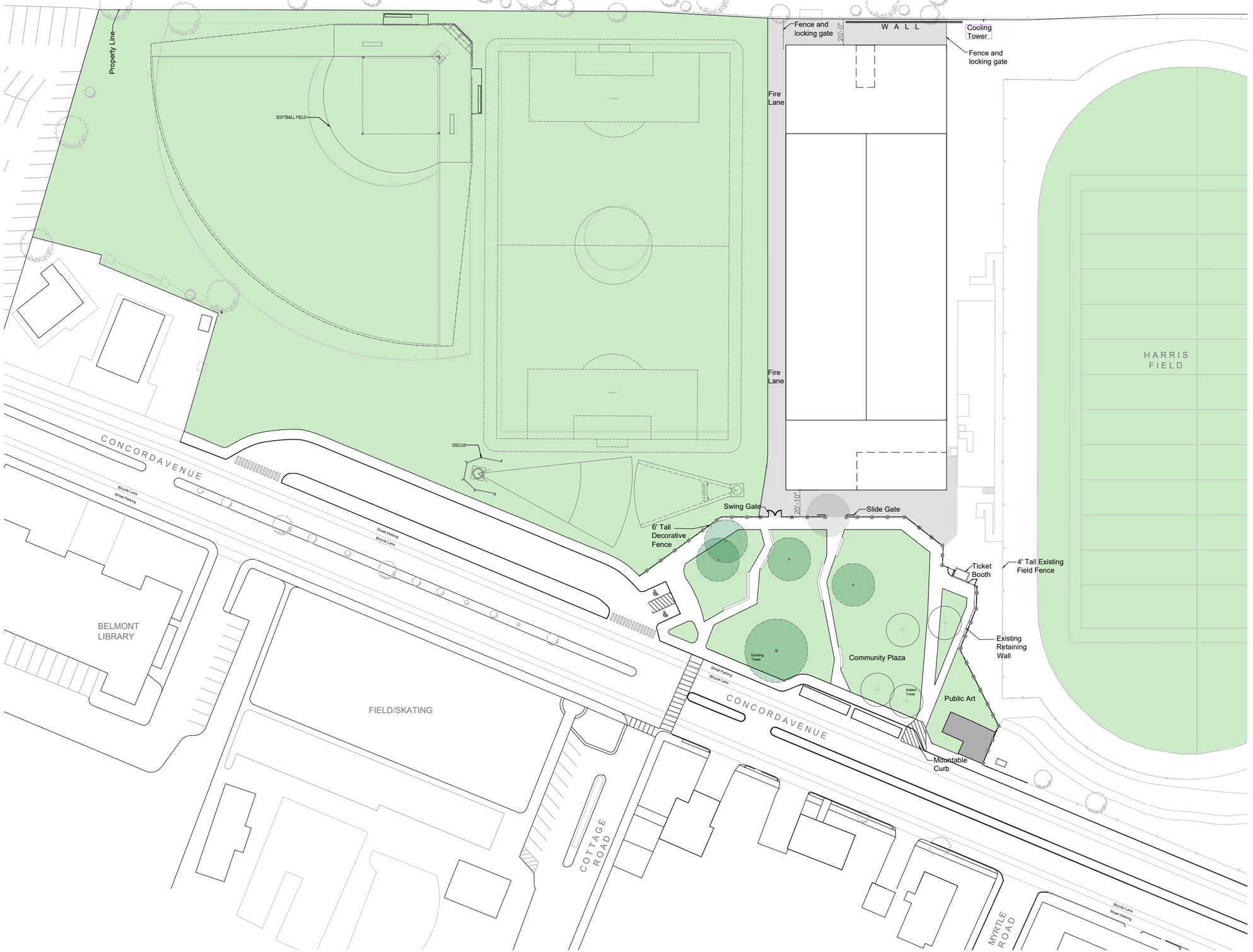

PROPOSED

Proposed Site Plan - New Plaza

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BELMONT INCORPORATED 1850

Photovoltaic Panels

Solar Design

Preliminary estimate at system sizing and cost:

- 436.8 kWdc
- 400.0 kWac
- 526,070 kWhr/year
- $1,092,000 total system cost, assuming $2.50/Wdc
- o As a note: under the IRA, municipal projects now qualify for an ITC direct payment of ~26.5% of the total system cost, or ~$289,380. This should be vetted by town officials and lawyers.

SOLAR DESIGN

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THE GALANTE ARCHITECTURE STUDIO

Helioscope Overview

BELMONT INCORPORATED 1859

Report

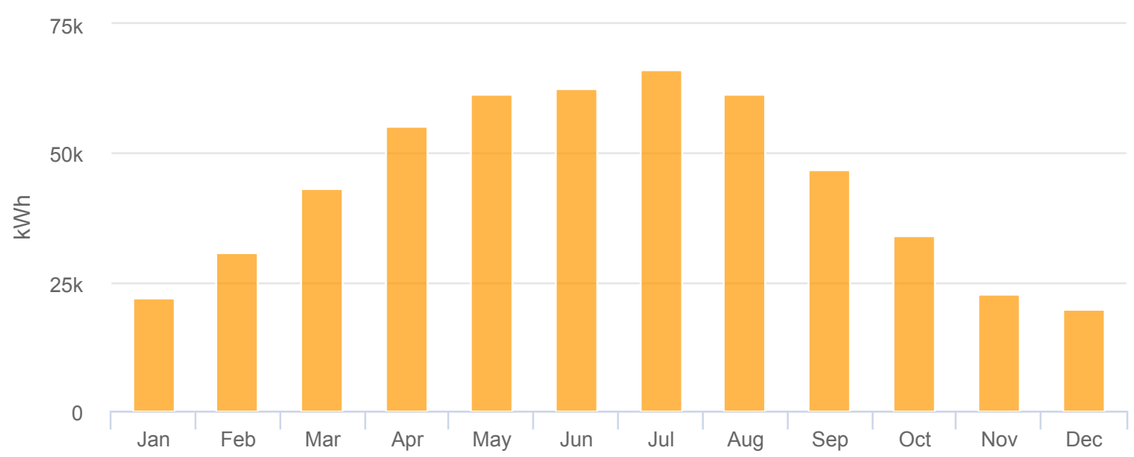
Project Name	Belmonte Skating Rink
Project Address	221 Concord Ave, Belmont, MA 02478
Prepared By	Nicholas Lawrence nlawrence@solardesign.com

System Metrics

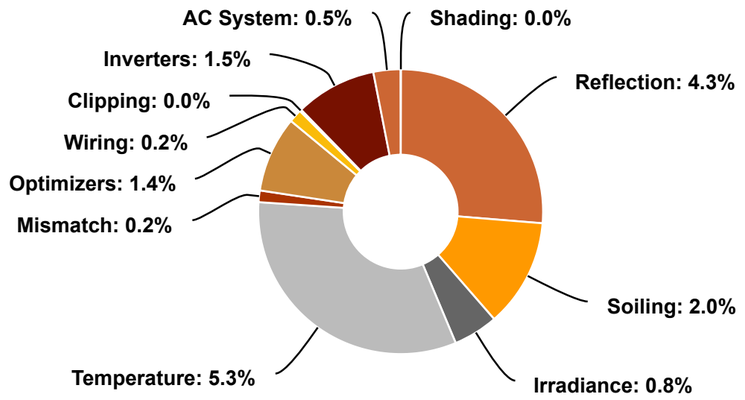
Design	Parametric design 1
Module DC Nameplate	436.8 kW
Inverter AC Nameplate	400.0 kW Load Ratio: 1.09
Annual Production	526.1 MWh
Performance Ratio	84.8%
kWh/kWp	1,204.4
Weather Dataset	TMY, 10km grid (42.35,-71.15), NREL (prospector)
Simulator Version	42f17df9d2-29fbd7cae3-be39569fd0-3d3015eac0

Project Location

Monthly Production



Sources of System Loss



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Annual Production Report

Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,422.7	
	POA Irradiance	1,421.0	-0.1%
	Shaded Irradiance	1,420.9	0.0%
	Irradiance after Reflection	1,360.2	-4.3%
	Irradiance after Soiling	1,333.0	-2.0%
	Total Collector Irradiance	**1,333.0**	**0.0%**
Energy (kWh)	Nameplate	582,324.5	
	Output at Irradiance Levels	577,512.8	-0.8%
	Output at Cell Temperature Derate	547,071.3	-5.3%
	Output After Mismatch	545,899.9	-0.2%
	Optimizer Output	538,253.2	-1.4%
	Optimal DC Output	536,952.3	-0.2%
	Constrained DC Output	536,765.4	0.0%
	Inverter Output	528,713.9	-1.5%
	Energy to Grid	**526,070.3**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp	12.1 °C	
	Avg. Operating Cell Temp	26.0 °C	
Simulation Metrics			
	Operating Hours	4692	
	Solved Hours	4692	

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (42.35,-71.15), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	Q.PEAK DUO XL-G10 480 (Qcells)	HelioScope	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									

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Annual Production Report

BELMONT INCORPORATED 1859

Components

Component	Name	Count
Inverters	SE100KUS (2022) (SolarEdge)	4 (400.0 kW)
Strings	10 AWG (Copper)	30 (3,651.8 ft)
Optimizers	P1101 (SolarEdge)	460 (506.0 kW)
Module	Qcells, Q.PEAK DUO XL-G10 480 (480W)	910 (436.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
East Zone	-	13-31	Along Racking
West Zone	-	13-31	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Portrait (Vertical)	7°	90.06591°	0.0 ft	1x1	455	455	218.4 kW
Field Segment 2	Flush Mount	Portrait (Vertical)	7°	269.7993°	0.0 ft	1x1	455	455	218.4 kW

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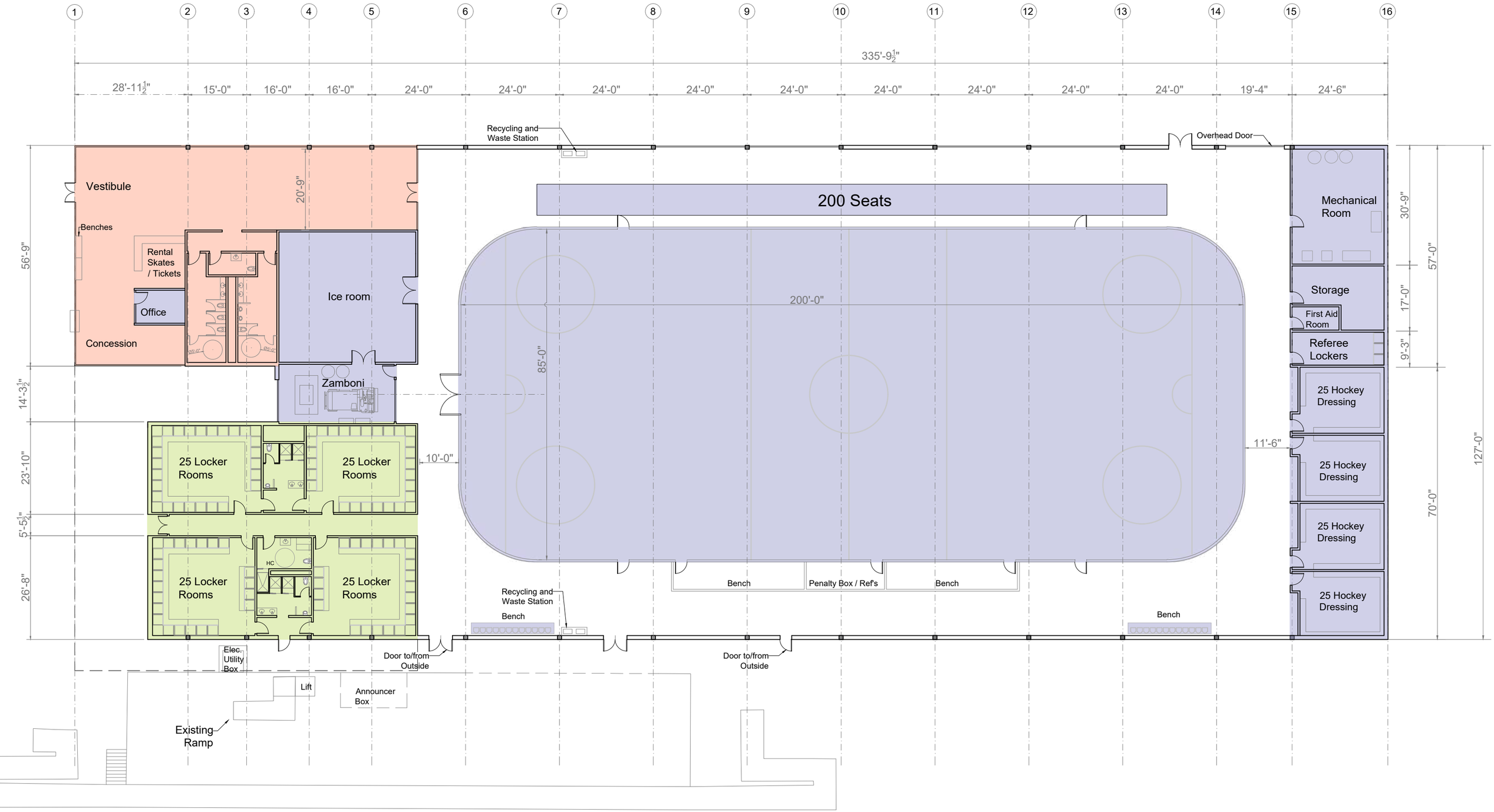

PROPOSED

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January 2023 - Proposed Floor Plan (1) ± 40,870 sf

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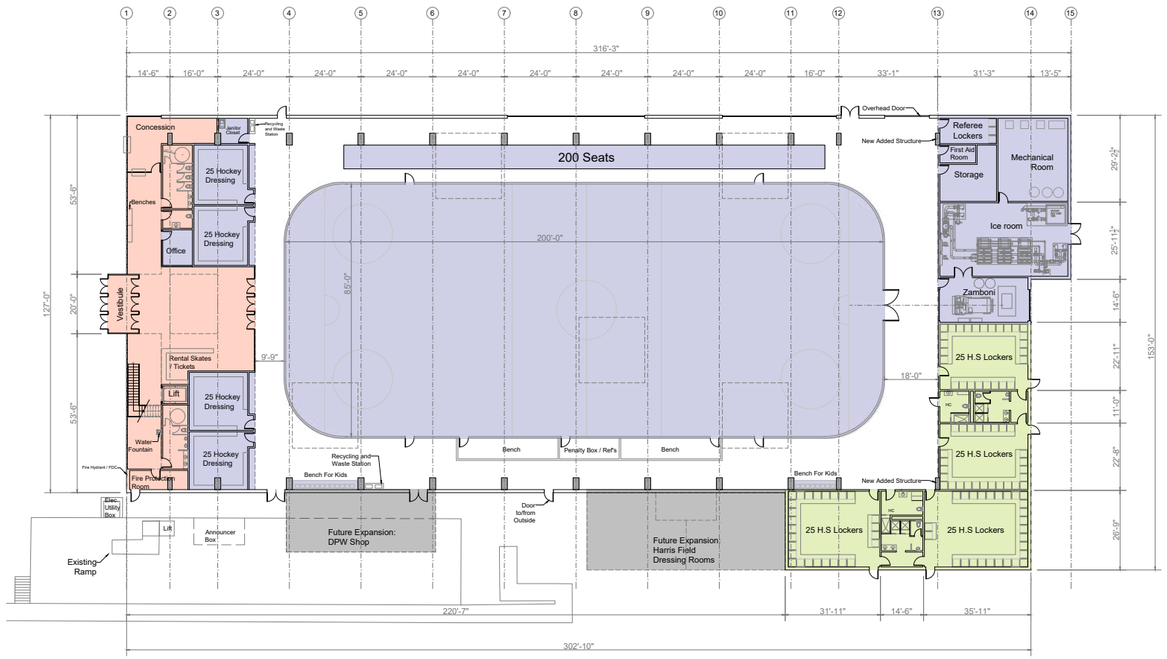

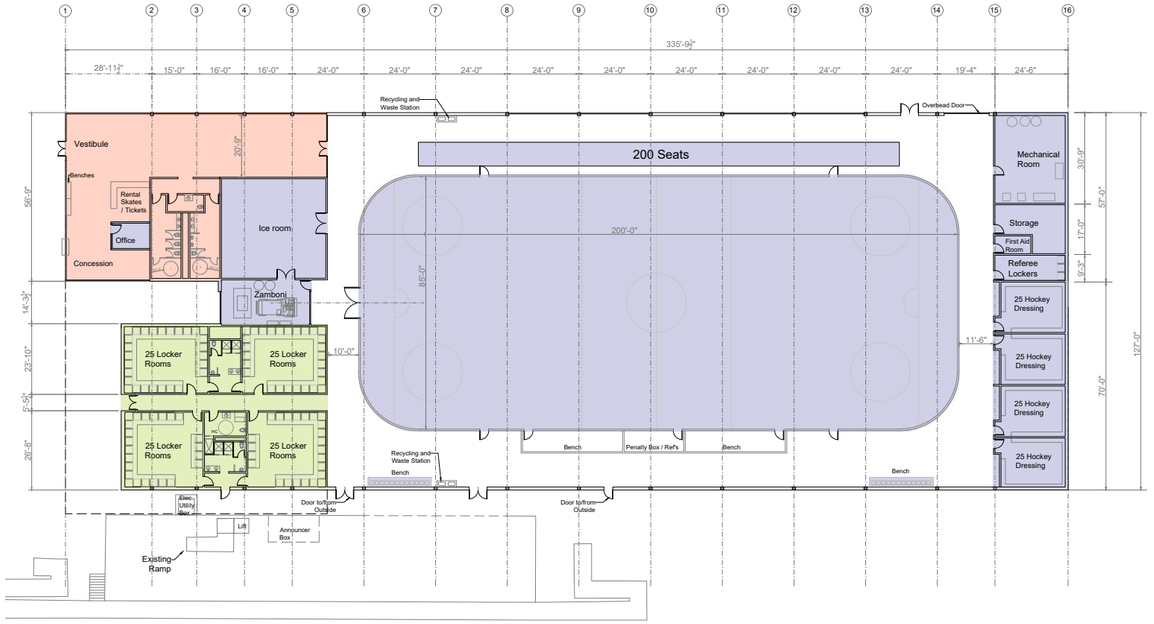

November 2022 Proposal

41,464sf @ $628/sf
= $26,039,392

January 2023 Proposal (1)

40,870sf @ $628/sf *
= $25,666,360

* application of $628/sf ?

COMPARISON

Current Savings = ± $373,032
(Not yet including PV of $2.1 million)

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PROPOSED

Proposed Site Plan (1) - Keeping WFH

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PROPOSED

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Proposed Site Plan (1) - New Plaza

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