THE NEW W. EDWARD BALMER SCHOOL

WHITINSVILLE, MASSACHUSETTS

SCHOOL BUILDING COMMITTEE MEETING

AUGUST 4, 2020

SMMA
Project Management

NORTHBRIDGE PUBLIC SCHOOLS

Massachusetts School Building Authority
Funding Affordable, Sustainable, and Efficient Schools in Partnership with Local Communities

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

DORE + WHITTIER

AGENDA

1. Irrigation System for School/ Town fields

IRRIGATION INITIAL COST SUMMARY

COST ITEM	OPTION 1 (BASE IN CONTRACT) (5) YARD HYDRANTS		OPTION 2 LOOP/QUICK-CONNECT SYSTEM WITH WELL		OPTION 3 FULL IRRIGATION WITH WELL
EXPLORATORY TEST WELLS	$0		$48,660 for (1) 6” exploratory bedrock well that can be used if viable GPM encountered, includes one $15K hydrofracture injection*		$48,660 for (1) 6” exploratory bedrock well that can be used if viable GPM encountered, includes one $15K hydrofracture injection*
DESIGN & PERMITTING	IN CONTRACT		Well Design by Driller, no Permitting required. Irrigation Design in contract.		Well Design by Driller, no Permitting required. Irrigation Design in contract.
WELL DRILLING	$0		$48,660 for (1) 6” bedrock well, includes one $15K hydrofracture operation*		$48,660 for (1) 6” bedrock well, includes one $15K hydrofracture operation*
PUMP & IRRIGATION SYSTEMS	(5) Hydrants + vaults, meters & valves in Contract		$301,380		$426,120
CREDIT TO AVOID MANUAL ESTABLISHMENT WATERING	$0		$0		($24,800)
WATERING EQUIPMENT	$3,000		$4,000		$0
INITIAL COST TOTALS	**$3,000**		**$402,700**		**$498,640**

* If GPM flow rate is not sufficient upon water discovery, hydrofracturing can be employed at $15,000 per injection, per well~~, up to 3 times per well.~~

IRRIGATION TOTAL COST OF OWNERSHIP SUMMARY

COST ITEM	OPTION 1 (BASE IN CONTRACT) (5) YARD HYDRANTS		OPTION 2 LOOP/QUICK-CONNECT SYSTEM WITH WELL		OPTION 3 FULL IRRIGATION WITH WELL
INITIAL COST TOTALS	**$3,000**		**$402,700**		**$498,640**
WATER	$12,000 – $37,600/ YR		$0		$0
WATER, 50-YEAR	$600,000 - $1,880,000				
MAINTENANCE	$1,000 / YR?		$1,500 / YR?		$2,000 / YR?
MAINTENANCE, 50-YEAR	$50,000		$75,000		$100,000
OPERATIONAL LABOR	216 HR/ YEAR		162 HR/ YEAR		24 HR/ YEAR
OPERATIONAL LABOR, 50-YEAR, $25/ HR	$270,000		$202,500		$30,000
TOTAL 50-YEAR COST OF OWNERSHIP	**$923,000 - $2,200,300**		**$680,200**		**$628,640**
RESULTS	VARIABLE, FAIR		VARIABLE, GOOD		PREDICTABLE, EXCELLENT

IRRIGATION OPTIONS FOR SPORT FIELDS

Base Option 1 – (5) yard hydrants, basic emergency watering

- using WWC potable water from 10” main
- could use irrigation well(s)

Option 2 - Loop with hose coupling quick-connects

- using irrigation well(s)
- phased step toward full irrigation

Option 3 - Full Irrigation

- using irrigation well(s)

- Dialog with WWC indicates that potable water use not advised for irrigation options.
- All options shown are schematic diagrams only. No detailed design has been completed at this time. Design will be delegated to the subcontractor and included in the price.

IRRIGATION SYSTEM QUESTIONS

1). What is the true cost of an irrigation system, with and without a well? ***See table following.***

2). Could the cost be reduced by doing a delegated design? Many of these firms design and install irrigation systems. ***System will be provided with delegated design by the subcontractor's registered sprinkler designer.***

3). What is the credit we'd receive from our landscape contractor who wouldn't have to use labor to move hoses during the original growth period? ***This savings is reflected in subcontractor pricing, see table following.***

3b). If we have an irrigation system, can we delete some field hydrants? What's the credit for that? ***Yes, except for one at the concession shed, the field hydrants would be deleted and credited, but they are only $250/per each.***

4). What is the annual consumption cost estimated to water the grass without a well? ***See slides following.***

IRRIGATION SYSTEM QUESTIONS

5). How often typically will the fields need watered, and what would the annual cost be estimated for a DPW staff person do that manually (moving sprinklers) for the 50-year design life of the facility.

- ***The frequency of watering depends on the season and rainfall and can vary widely.***
- ***Grass needs about 1 inch of water/rainfall per week to thrive; we assumed peak watering 3x week to achieve this.***
- ***Assume five cannons would need to be moved three times per watering, assume 12 minutes each move = 3 hours per watering x 3 per week x 4 per month x 6 months = 216 Person-hours x 50 years = 10,800 person-hours.***
- ***There is currently no budget or staff to perform manual watering, and it is done by volunteer groups if at all.***

6). If the system only runs at night, can the WWC provide enough pressure and volume to irrigate without causing a large pressure drop in the neighborhood? ***WWC did not analyze to this level. WWC recommends drilling irrigation wells.***

7). What is the net cost of the system? ***See table following.***

IRRIGATION SYSTEM QUESTIONS – POST-7/21

1 + 2. Could the irrigation well be used for the watering needs of the original design [Option #1]?

Well(s) could conceivably be used for watering for any of the Options 1, 2 or 3. The well supply would be connected to a valve pit/vault that would feed the Option #1 yard hydrants.

Option #1 is the original design, including (4) yard hydrants and (1) hose bibb - (5) water outlets total.

A potable water source would still need to be provided for the Concession Building for the outside hose bibb, either tapped off the 10" water main, or from the school building. There will be no indoor plumbing in the concession building, similar to the existing structure now demolished.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

3. Are the water costs calculated in the "Irrigation Total Cost of Ownership Summary" inflated since Whitinsville Water Company already told us they would not be able to supply that much water, due to drought restrictions and restrictions issued by the Commonwealth of Massachusetts?

The costs presented in the "Irrigation Total Cost of Ownership Summary" are hypothetical because neither the Town nor School water the fields now, nor is there any budget to do this watering in the future.

The costs were presented as a point of comparison to the other two options and were based on good faith estimates given several uncertain variables.

If watering were to occur, and it was a dry year that somehow did not trigger WWC-declared drought watering restrictions, it is possible to reach the upper end of the range given.

A normal year watering would be about 32% of the maximum, which was the lower end of the range given.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

4. Are the operational labor costs calculated in the “Irrigation Total Cost of Ownership Summary” based on hiring additional employee(s)? These tasks would be performed by current staffing levels and/or volunteers, so in effect would there be any additional cost of labor?

The operational labor costs calculated in the “Irrigation Total Cost of Ownership Summary” were an effort to provide a reasonable estimate of FTE person-hours necessary to manually water the fields.

Whether an additional employee is hired or existing employees are utilized to do the watering, it represents a block of time occupied with this task, where other required tasks are not getting done.

If the labor is performed by volunteers, it gives one an idea of how much labor the Town is asking to be done by those people.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

5. Why wasn't an irrigation system in the original plans put forth to the taxpayers? As a committee, do we look 'out of touch' spending half a million dollars on a 'want' vs. a 'need,' especially facing looming budget cuts due to tax revenue down between 30-60%, and the Commonwealth having the highest unemployment rate in the country?

Irrigation is an Owner choice and is never included in D+W projects as a given. We do many school projects with successful fields without irrigation. The key is to follow the specification as to planting season and seeded lawn establishment period.

An irrigation system was not part of any requirements given to us by the Working Group or School Building Committee.

We advised many times in design presentations and in the Owner's Project Requirements document that the fields were not irrigated.

Also, we believed no irrigation was possible in order to achieve one of the LEED Water Efficiency credits. When irrigation was first brought up, we clarified that sport fields are exempt from that LEED requirement.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

6. In our [7/21/20] meeting, it was mentioned that if we went with town water, we could not use WWC water during times of drought. The argument was that we could [water] with a well. Based on the research that I did and my own personal knowledge, wells are also impacted by drought conditions and can run dry. It is suggested that homeowners with wells should also reduce their water usage during a drought. Was this taken into consideration?

Wells of any kind can experience the effects of a drought, but according to the well driller with whom we have been consulting for pricing, this is very rare in deeper bedrock wells.

The driller stated that wells can be impacted by over-use, if there are a lot of wells in close proximity being used for irrigation at the same time.

A general review of the MA Well Database for Northbridge indicated only one well within close proximity, on North Main Street, which appears to be a domestic well. A comprehensive well study is outside the scope of work and has not been performed.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

7. I would like to better understand the estimated 50-year cost that was calculated. It seems to be significantly inflated.

Option 1 - the assumptions used in the calculation are as follows:

WATER: quantities derived from calculated water use by the irrigation consultant; a range from Peak Use (~$37.6K) down to Average Use (32% of peak - ~$12K) was given. Water and meter charge costs based on current WWC rates. WATER, 50-YEAR are those numbers x 50.

MAINTENANCE was a reasonable estimate based on conversation with District staff x 50 years.

OPERATIONAL LABOR - assumptions laid out in detail on Slide 5 previously in this presentation - these are reasonable, good-faith time estimates; again x 50, for 50-year cost. One could take issue with the labor rate of $25/hour which is an assumption that an above-living-wage Town employee would be doing the watering.

TOTALS are the sum of the 50-year costs. We stand by this number as a fair and accurate estimate.

Option 2 and 3 costs are straight from FBI's sub cost estimates or, again, based on reasonable assumptions derived from conversations with the District for maintenance costs. Labor costs are good-faith estimates based upon the realities of the options.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

8. There is also a potential impact to neighbors with wells if one is drawing too much from their well. Are there neighboring wells in use?

A general overview of the MA Well Database for Northbridge indicated only one well within close proximity, on North Main Street, which appears to be a domestic well.

A comprehensive well study is outside the scope of work and has not been performed.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

9. What is the approximate value of the investment the town is making in our fields at the new Elementary School, i.e.: grading improvements, drainage, subgrade, seed mix, etc.?

Drainage systems, custom sand blend, screened/amended/re-spreading of loam, topical fertilizer and seeding: $400,000.

Pricing did not include site clearing / tree removal, cut to grade, or sub-grade prep as that is considered sitework required regardless of fields or other hard/soft-scapes.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

10. What would the approximate repair and reseeding costs be if we didn't irrigate the fields during a dry summer and the grass died or became an unmanageable weed field requiring repair/ re-seeding? (A square foot # is close enough)

The cost per hydro-seed tank truck is $2,300. A tank covers approximately 8-10k SF. This value does not include any warranty or establishment maintenance/labor (watering, mowing etc.).

FBI believes if re-seeding or repairs were required, it would likely be performed by the school or Town.

IRRIGATION SYSTEM QUESTIONS – POST-7/21

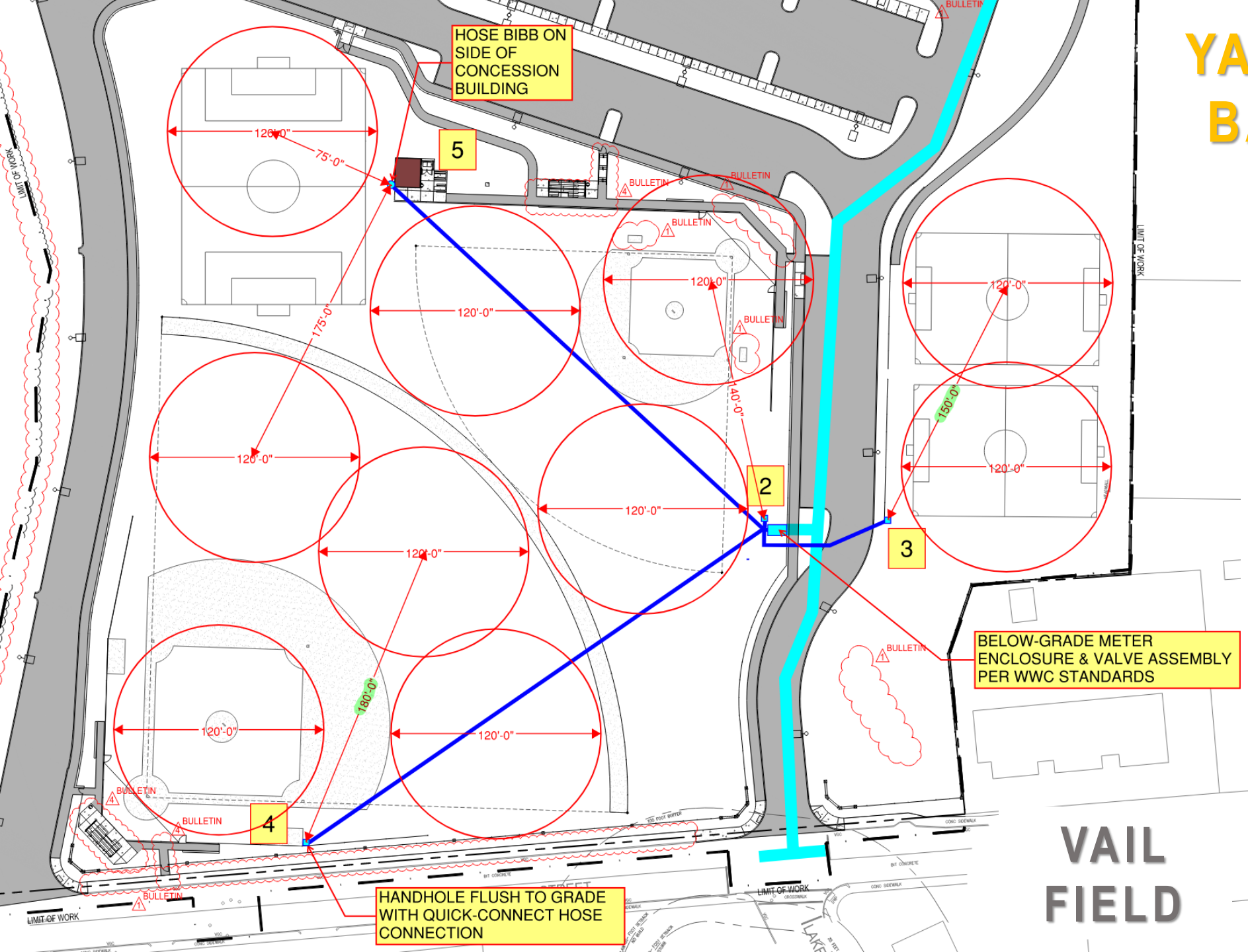
11. Please confirm that the fields at our other NPS institutions (NMS and NHS) have active irrigation systems (fed by Whitinsville Water Co).

It has been confirmed by the District that the Middle School and High School have functioning, active irrigation systems, with water supplied by WWC.

The high school's upper field is 18 acres and the middle school is 14 acres.

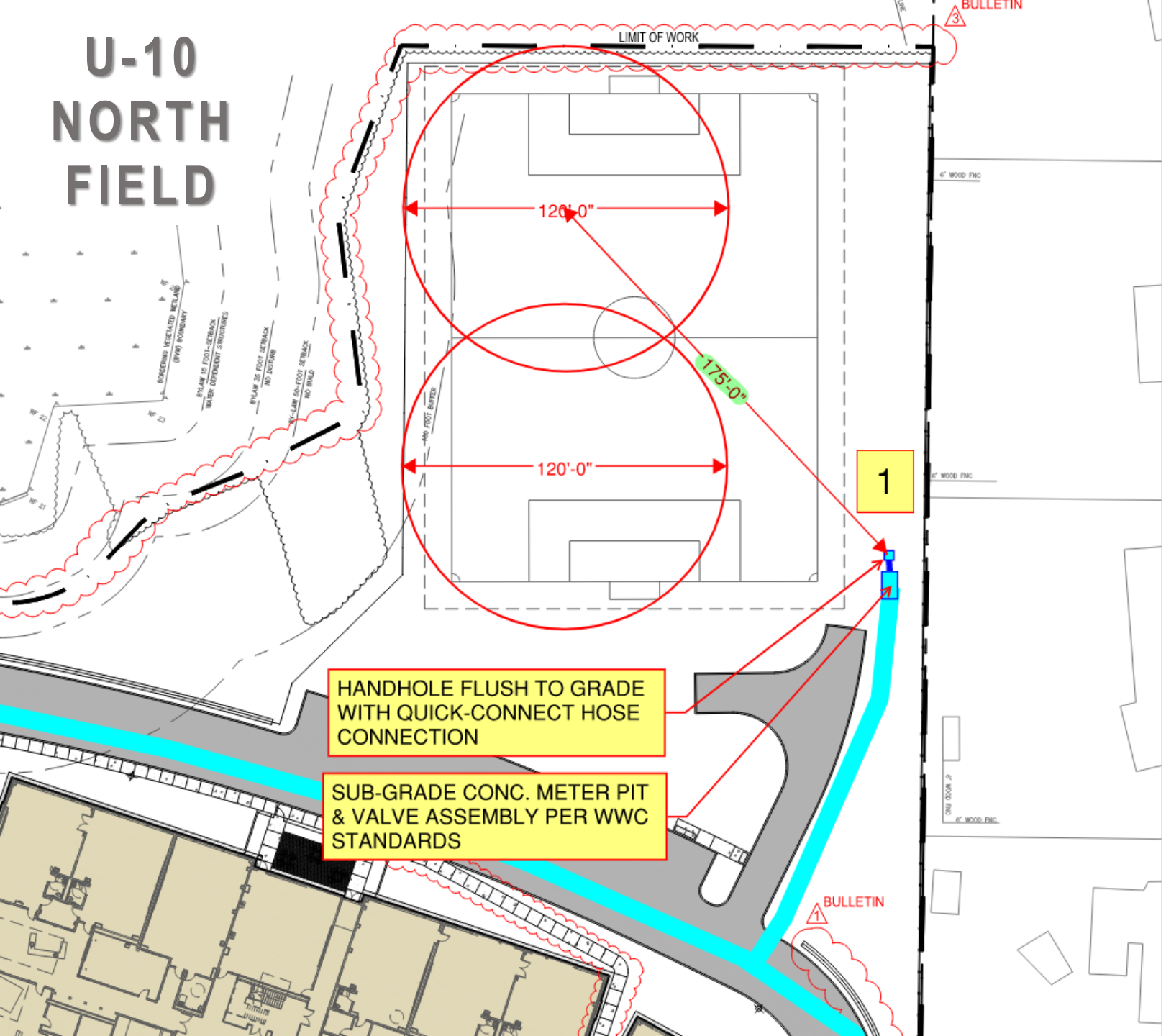
The systems are run from May until September. All watering is done at night starting at 9:00 PM. The middle school has 18 zones running at about 15 minutes a zone. The high school has 36 zones running for 20 minutes. Every zone has about 4 sprinkler heads. They're run daily and fields are monitored every day. If rain is coming, the system is shut off a few days prior.

The average cost of watering from FY'12 to FY'20 has been $8,774 for the Middle School and from FY'12 to FY'16 has been $14,490 for the High School (there appear to be unexplained problems with the HS data after 2016).



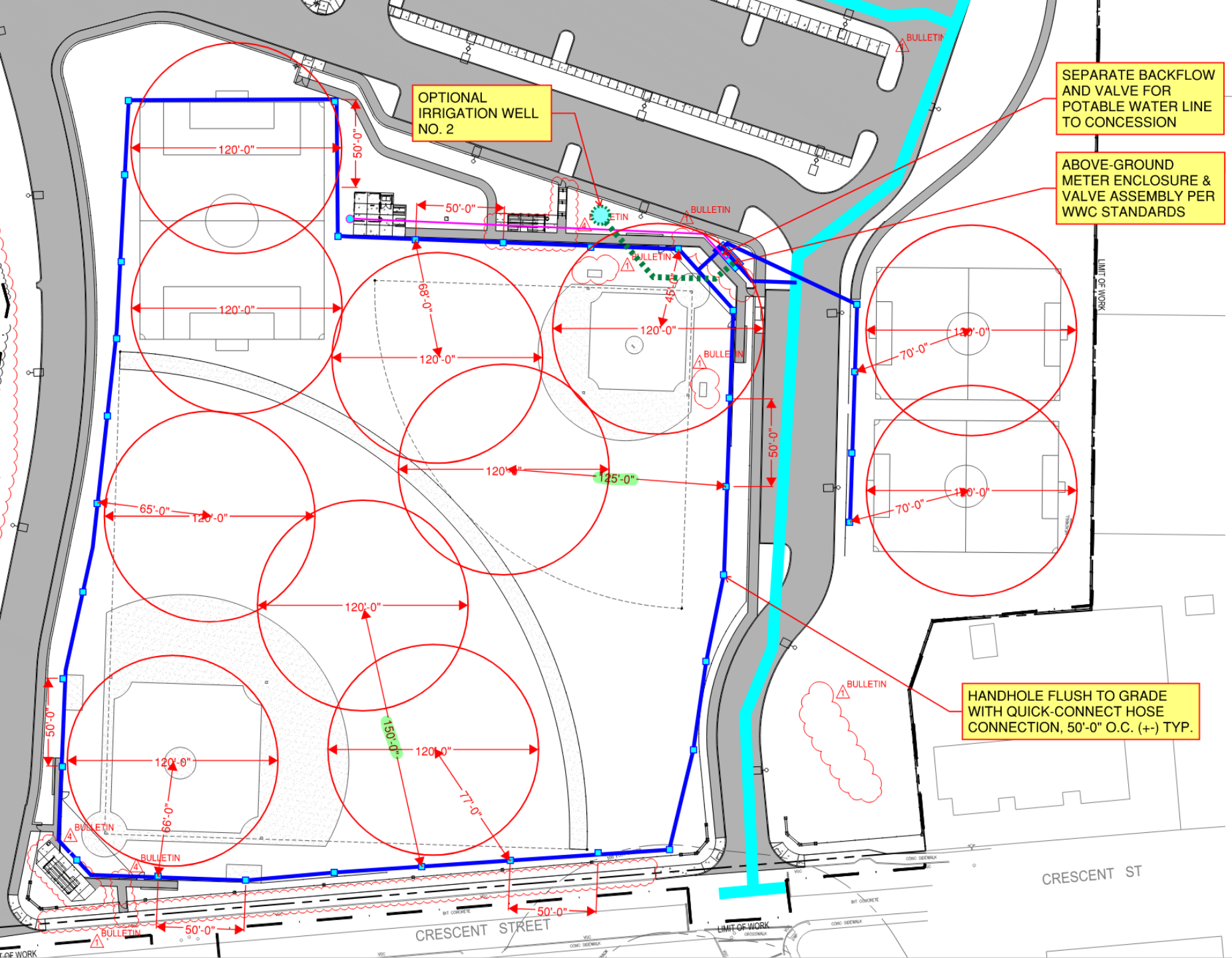
YARD HYDRANTS: BASE OPTION 1

- Basic watering during dry periods
- One yard hydrant hose connection per field group; (5) total
- Use curtailed/ prohibited during declared “dry periods” (odd/even days) or drought/ water emergencies
- Very inefficient watering method, poor coverage



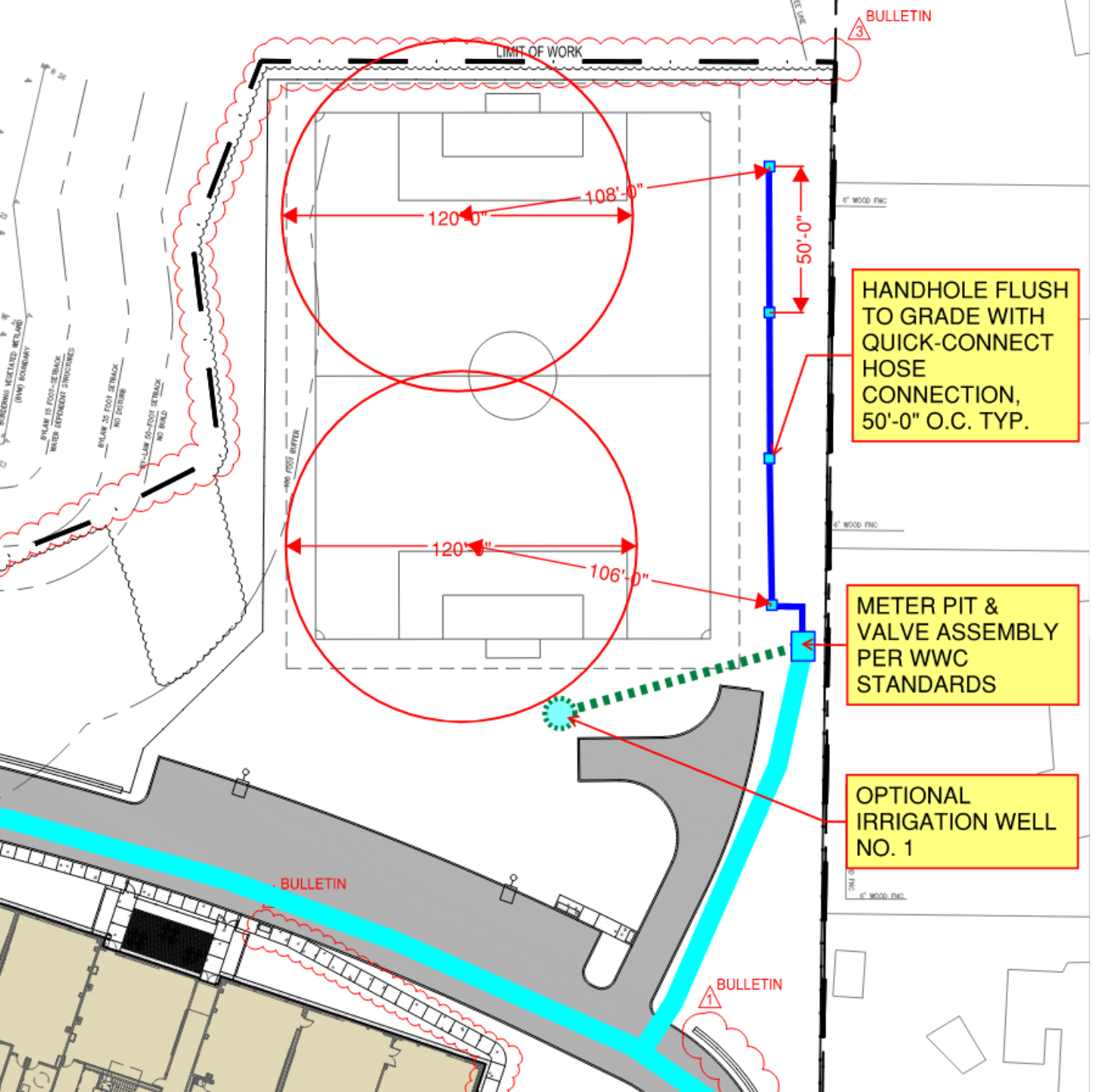
YARD HYDRANTS: BASE OPTION 1

- Ongoing cost of potable water purchased from WWC
- Assumes a large amount of volunteer labor to move hoses and sprinklers
- long hoses = friction/pressure loss
- Recreation Commission owns no hoses or sprinkler equipment



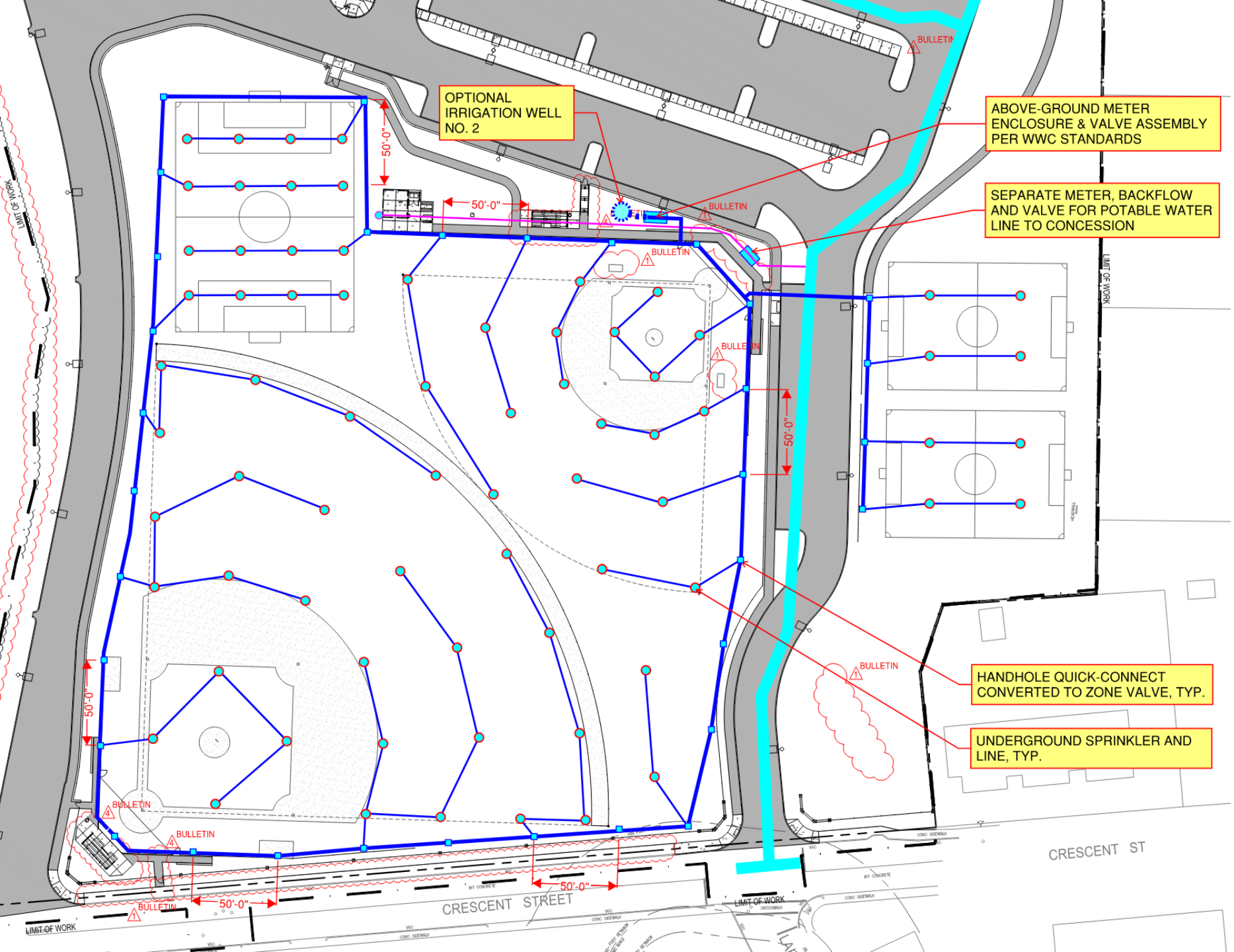
OPTION 2: LOOP WITH QUICK-CONNECTS

- "Phased Option" – loop infra-structure now for full irrigation system later
- Quick-connect hose bibbs in hand holes at 50' on center
- Install controller wire in loop for later use
- Surface watering with hoses and rotary sprinkler guns
- Shorter hose runs, more convenient hookups, less friction loss, less labor
- Quick-connects can be easily converted to in-ground sprinkler branch runs



IRRIGATION OPTION 2: LOOP WITH QUICK-CONNECTS

- Basic watering during dry periods
- Recommended to drill irrigation wells with this option
- Still an inefficient watering method; better access to couplings but still poor coverage



IRRIGATION OPTION 3

- "Complete Option" – loop infrastructure is trunk for full irrigation system
- Quick-connect in hand holes converted to zone valves
- Installed underground lines and sprinklers
- Automatic, timed, zoned
- Seasonal maintenance required
- Assumes irrigation wells

WATER CONSUMPTION CALCULATION

(2) U-6 FIELDS	Monthly peak demand (cu ft)	
May	4483	75% of monthly peak
June	4483	75% of monthly peak
July	5977	100% of monthly peak
August	5977	100% of monthly peak
September	4483	75% of monthly peak
October	4483	75% of monthly peak
Total (6 mo annual Est Peak Demand)	**29,885 cu ft**	

U-10 +VAIL FIELDS	Monthly peak demand (cu ft)	
May	89,889	75% of monthly peak
June	89,889	75% of monthly peak
July	119,853	100% of monthly peak
August	119,853	100% of monthly peak
September	89,889	75% of monthly peak
October	89,889	75% of monthly peak
Total (6 mo annual Est Peak Demand)	**599,263 cu ft**	

Performed by General Irrigation Engineering (GIE) of Westwood, MA

←(2) U-6 soccer fields west of the school, which are planned to be irrigated using the school's potable water supply and will be connected to the school (9,415 SF area)

←U-10 field (north) and the Vail Fields: (3) U-8 soccer fields, and large and small baseball fields (188,790 SF total area), the source of the water which we are currently inquiring about.

- These are PEAK FLOW numbers!
- Normal expected flows are more like 30-32% of these peak calculations
- That said, we have to plan for the peak.

Questions to Whitinsville Water Co.:

- **Could WWC supply this peak demand to the school fields for irrigation?**
- **Even if they could supply the water, would it be subject to a drought restriction if a water emergency were declared? If so, to what degree?**

Refer to email from Randy Swigor in packet

WATER CONSUMPTION CALCULATION

(2) U-6 FIELDS	Monthly peak demand (cu ft)	
May	4483	75% of monthly peak
June	4483	75% of monthly peak
July	5977	100% of monthly peak
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September	4483	75% of monthly peak
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Total (6 mo annual Est Peak Demand)	**29,885 cu ft**	

U-10 +VAIL FIELDS	Monthly peak demand (cu ft)	
May	89,889	75% of monthly peak
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October	89,889	75% of monthly peak
Total (6 mo annual Est Peak Demand)	**599,263 cu ft**	

Rough cost calculation:

(2) U-6 Fields:

Peak 29,885 cu ft / 100 x $4.83 per 100 cu ft =	$1,444
Meter charge (Assume 1.5") $73.88 x 6 mos =	$443
Meter install/ de-install charge (estimate)	$200
Annual Maintenance (estimate)	$500
Total (Peak year)	**$2,587**
Total (Average year - 32%)	**$828**

U-10 + Vail Fields:

Peak 599,263 cu ft / 100 x $4.83 per 100 cu ft =	$28,945
Meter charge (Assume 2") 120.48 x 6 mos =	$723
Meter install/ de-install charge (estimate)	$200
Annual Maintenance (estimate)	$1500
Total (Peak year)	**$31,368**
Total (Average year - 32%)	**$10,038**

OPTION 1
WATER CONSUMPTION CALCULATION

U-10 + Vail Fields - Consumption and Cost for Manual watering by surface hoses and water cannons:

Watering via hoses and cannons is about 20% less efficient.

Peak 599,263 cu ft x 1.20 = 749,032 cu ft

U-10 + Vail Fields:

Peak 749,032 cu ft / 100 x $4.83 per 100 cu ft =	$36,178
Meter charge (Assume 2”) 120.48 x 6 mos =	$723
Meter install/ de-install charge (estimate)	$200
Annual Maintenance (estimate)	$500
Total (Peak year)	**$37,600**
Total (Average year - 32%)	**$12,032**

Drone overview of building site, 7/16/20

QUESTION AND ANSWER