CCHS Model School Analysis

Hudson-on-the-Field
and
WH-on-the-Hill

One person's view of whether it makes sense to pursue the idea

By Stan Durlacher

MSBA Model School Benefits

- *Model Schools are efficient in design and easy to maintain, contain optimal classroom and science lab space, can easily accommodate higher or lower enrollments, incorporate sustainable, "green" design elements when possible and are flexible in educational programming spaces while encouraging community use.*

- *Benefits from the Model School Program include:*
  - *Simplify the Design Process*
  - *Reduce Design Fees*
  - *Shorten the Project Schedule*
  - *Reduce exposure to Cost Escalation*

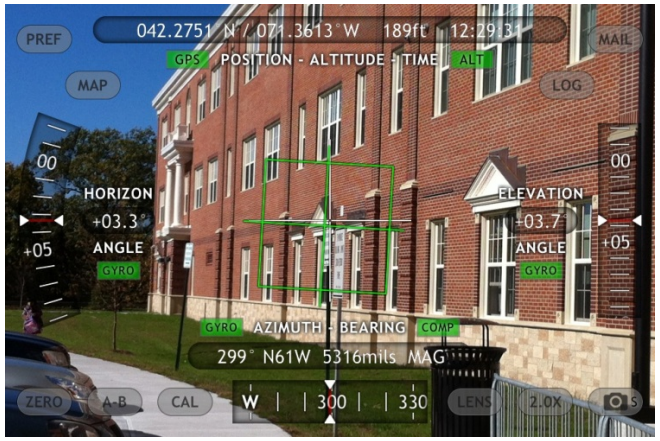
- *Districts participating in the Model School Program are eligible to receive five additional percentage points which are added to the base rate of MSBA reimbursement for eligible costs.*

- *The Model School Program reduces project costs and completion time by adapting proven elements from recently completed schools and tailoring them to local needs to ensure cost-efficient, easy-to-maintain designs.*

A Few Comments/Observations

- Why I produced my own analysis
- The work and results were not produced at the request of or for the benefit of the Building Committee, School Committee or School ADministration.
- I took the time to visit four Model Schools to familiarize myself with the sites, site topography, site finishes, building design and building materials.
    - Whitman Hanson
    - Hudson
    - Ashland
    - Natick

Flat Sites is the consistent observation:



Baseline $ / GSF Comparison

- CCHS Existing Budget

1,225 Enrollment
236,937 GSF Gym & Ed Bldg.
$74,989,918 Budget

$316.50 / GSF

- Comparison for $/GSF for the average of
  10 Model Schools
  Normalized to mid-point of CCHS construction (3/14)

1,235 Enrollment
247,942 GFS (includes two gyms)
$72,422,547 Budget

$307.10 / GSF

Concord-Carlisle High School

Analysis of Active MSBA Model School Project Costs

All information gathered from MSBA web site / new construction high schools only

9/26/2012

	A	B	C	D	E	F	G	H	I	J	K	L
	SCHOOL	ENROLLMENT	SQFT	CONST. COST	$/SQFT	START OF CONST.	ESCALATION (1)	NON-ESCALATED CONST. COST (2)	CONST. START TO 03/2014 (3)	ADJUSTED ESCALATION RATE (4)	RE-ESCALATED CONST. COST (5)	ADJUSTED $/SQFT (6)
1	DUXBURY	1,735	322,105	$ 99,196,234	$ 308	06/2012	$ 3,354,462	$ 95,841,772	21	5.3%	$ 100,873,465	$ 313
2	E. BRIDGEWATER	950	211,484	$ 60,320,137	$ 285	10/2011	$ 1,756,897	$ 58,563,240	29	7.3%	$ 62,809,075	$ 297
3	FRANKLIN	1,650	306,543	$ 87,914,728	$ 287	10/2012	$ 1,299,232	$ 86,615,496	17	4.3%	$ 90,296,655	$ 295
4	HAMPDEN/WILBRAHAM	1,225	231,467	$ 66,493,091	$ 287	05/2010	$ 1,243,002	$ 65,250,089	46	11.5%	$ 72,753,849	$ 314
5	MARSHFIELD	1,310	267,469	$ 80,848,464	$ 302	08/2012	$ 2,377,682	$ 78,470,782	19	4.8%	$ 82,198,144	$ 307
6	MONOMOY	700	168,000	$ 52,962,105	$ 315	01/2013	$ 1,542,586	$ 51,419,519	14	3.5%	$ 53,219,202	$ 317
7	NATICK	1,300	254,095	$ 70,825,000	$ 279	06/2010	$ 4,322,662	$ 66,502,338	45	11.3%	$ 73,983,851	$ 291
8	PLYMOUTH	1,350	267,064	$ 72,005,925	$ 270	01/2010	UNKNOWN	-	-	-	-	-
9	SOMERSET BERKLEY	1,000	222,826	$ 66,840,822	$ 300	06/2012	$ 1,244,822	$ 65,596,000	21	5.3%	$ 69,039,790	$ 310
10	TEWKSBURY	1,100	218,784	$ 65,946,516	$ 301	09/2010	$ 974,579	$ 64,971,937	42	10.5%	$ 71,793,990	$ 328
11	WEST SPRINGFIELD	1,270	257,525	$ 73,295,000	$ 285	10/2011	$ 1,560,100	$ 71,734,900	29	7.3%	$ 76,935,680	$ 299
12												
13	AVERAGE	1,235	247,942	$ 72,422,547	$ 293		$ 1,967,602	$ 70,496,607			$ 75,390,370	$ 307
14												
15	CCHS (CURRENT/TURNER)		237,068	$ 74,989,915	$ 316	03/2013					$ 74,989,915	$ 316

(1) All Total Construction Costs (column D) include escalation to the midpoint of construction. This is the value is called out in the MSBA project cost spreadsheet.

(2) Total Construction Cost (column D) minus included Escalation (column G)

(3) Project Start of Construction (column F) to March 2014 (CCHS midpoint, basis of CCHS escalation) in months

(4) Number of months (column I) applied at 3% per 12 months

(5) Non-escalated Construction Cost (column H) multiplied by Adjusted Escalation Rate (column 4)

(6) Re-escalated Construction Cost (column K) divided by SQFT (column C)

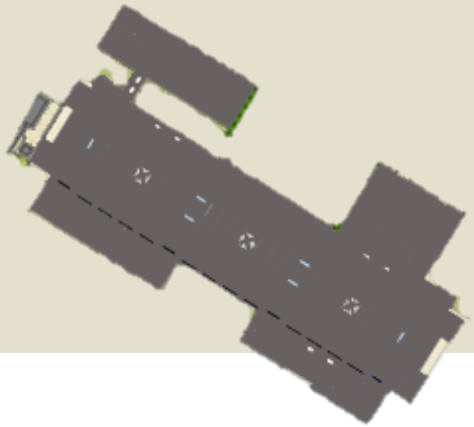
Baseline Footprint Comparison

- CCHS Existing Design

1,225 Enrollment

55,000 sf footprint of Main Bldg

Four Story Main Building

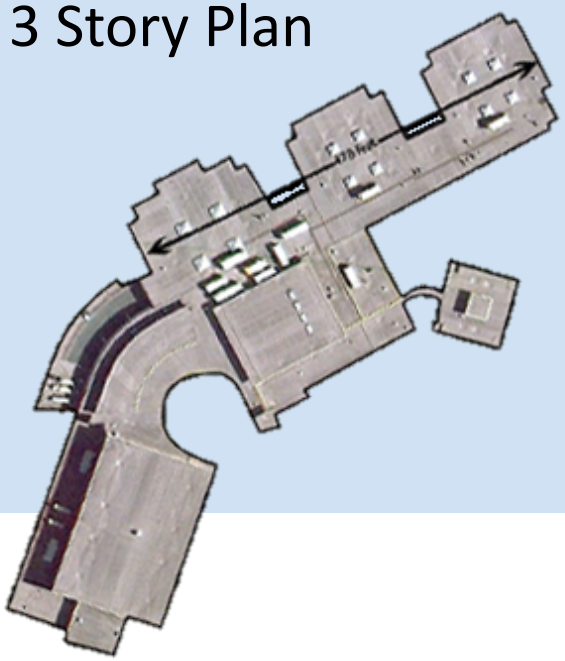


- Comparison for size is Hudson HS

1,253 Enrollment

88,000 sf footprint

2and 3 Story Plan

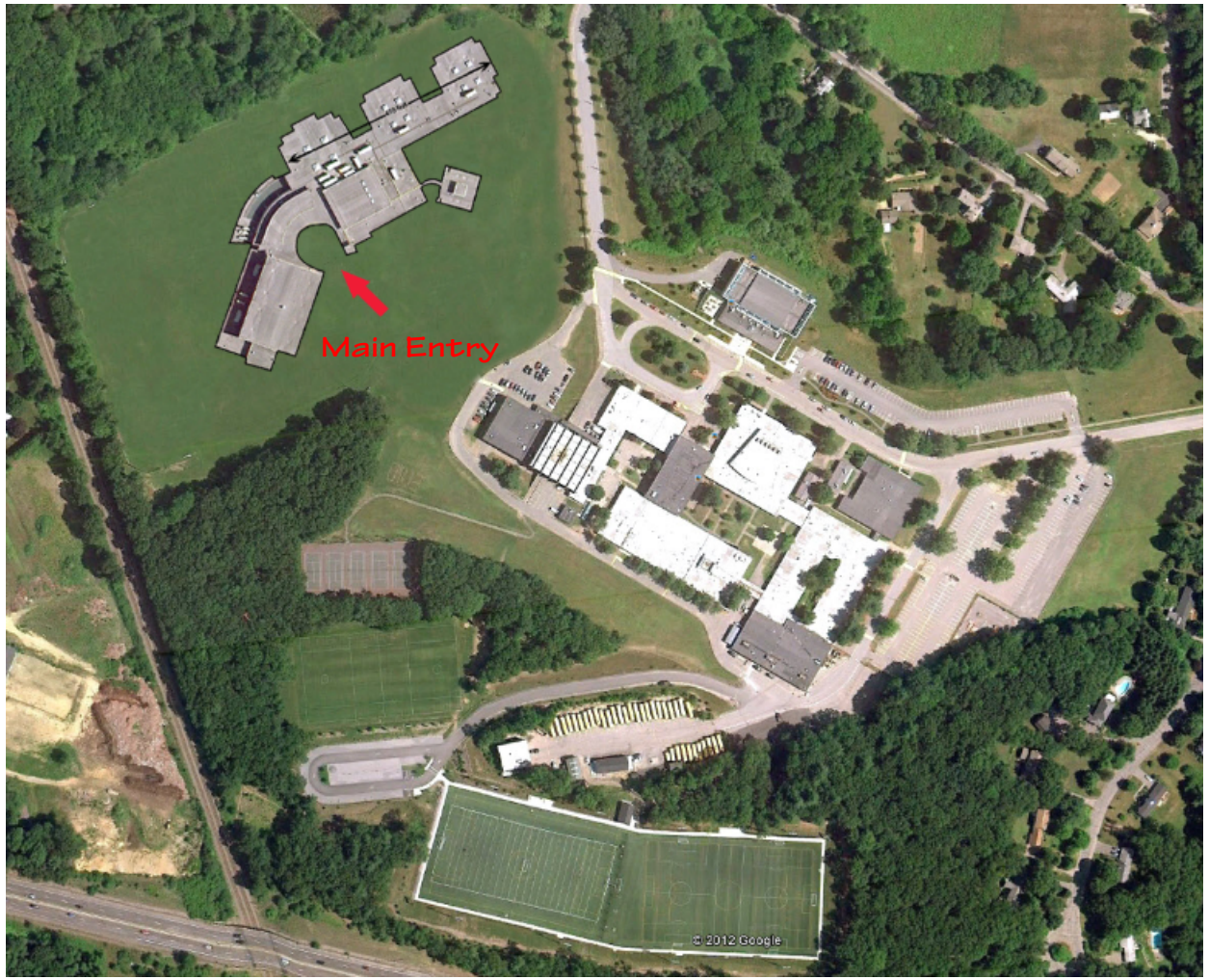


Note: Relative Scale is Accurate

Some Broad Working Assumptions on "Field":

- Analysis will use $ 307.10/GSF from before and a configuration of Hudson HS for a hypothetical "CCHS Model School" fit plan graphic. (CCHS MS)
- CCHS Model School will work with no adaptations or changes to it to accommodate the CCHS Ed Spec. This means $0 incremental for design or construction differences to the $ $$/GSF for academic-related program changes.
- No incremental $$ will be included in the "Field" analysis for working around the suspension or relocation of the CCHS athletic program(s) for a period of 3-4 years.
- Even though the athletic field site is proximate to wetlands, this analysis contains no incremental $$ associated with wetlands mitigation or delays due to wetlands issues.
- This analysis assumes that the CCHS MS will be acceptable for impervious soils calculations and can be designed to meet Water Conservancy /NCR requirements.
- Other than site storm water drainage and scope increases for new athletic fields, the site work that are surrounding the CCHS MS building (parking lots, roadways, access roads, sidewalks, hardscape around the building) will have no incremental cost increase to the existing site work budget.
- MACHPS are exactly as contained in the selected Model School design. No further sustainability performances will be considered and no incremental costs will be carried in addition to what is in the $307.10/GSF. CCHS MS green design is WYSWYG.

Hudson-On-the-Field Layout



So, is CCHS MS a Viable Idea?

Existing Design	236,936 GSF	x	$316.50/GSF	=	$74,989,918
CCHS MS Academic Building	237,936 GSF	x	$307.10/GSF	=	$69,984,146
Sq ft for second gym included					
Less: 5.0% Additional Reimbursement					-$ 3,499,207
Less: not replacing Bus Depot					-$ 1,500,000
					$ 64,984,938

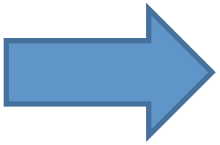
Looks like a net cost savings of $10,004,980 !!!

- But, there is more to the analysis.
  - The Athletic Fields location has geotechnical issues to solve.
  - This location is the low point on the site and needs upland storm water retention
  - Need to carry the additional replacement costs for new ADA compliant athletic fields
  - Need to forecast additional construction time and escalation for the increased scope
  - Need additional design fees for placing a model school plan in different site
  - And a few other expenses….

Let's step through these one at a time and then see where we stand on the bottom line.

Geotechnical Issues

"We did encountered an approximately 10 foot thick layer of stiff to hard clay below 15 to 25 feet of medium dense sand in the borings drilled at the lower fields for the new proposed school location. Due to the amount of fill to be placed to raise grades in this area for the new school we anticipate that settlements of the clay will occur and further evaluation will be required to determine how much. Placement of the fill to raise grade plus a surcharge load may be required several months prior to construction of the footings, however this needs to be evaluated. Addition drilling to collect samples of clay for laboratory testing will also likely be required for further analysis."



Analysis Items:

- Remove unsuitable Soils to 8 ft depth in expanded footprint of building.
- Place 18 ft surcharge in building footprint plus apron area
- Monitor underlying clay settlement during a 9 month surcharge period
- Remove excess surcharge materials

Geotechnical Issue Costs

Existing Soils Conditions need Remediation and Surcharge Loading		
Dig out existing unsuitable soils	$359,822	Excavate and dispose of 8 ft of existing unsutiable structural fill materials, use 1.15 size factor for roadways and utilities, 30,000 cu yd
Bring in surcharge Materials	$2,374,827	Bring in Surcharge materials to elevation of +10ft. Above existing elevation Use 1.10 for slope increase area
Leave Surcharge Materials in place for 9 months.	$290,000	Cost of maintaining Slopes, erosion controls, geotechnical monitoring, survey work, borings, etc.
Escalation Budget Increase for Surcharge Duration	$1,350,000	Cost of Escalation for postponing construction start on building. These are incremental to the escalation numbers in the current budget.
OPM and CMR Incremental Costs	$558,000	Costs to maintain the OPM and CMR project teams during surcharge timeframe. Assume designers are designing site work, etc. during this timefreme.
Remove the top surcharge load	$593,707	Establish the bottom of footing elevations by removing 12 ft of surcharge

Increased Hard Cost items

Additional Hard Cost Items		
Pumped Storm Water Retention system	$850,000	Because the site is now at a low point, need to pump storm water to an upland storage and retention system. Estimate for infrastructure to pump and hold storm water. Increased Emergency Generator Sizing for pumping.
Longer Construction Cycle for Site Preparations due to larger foundation scope, subsurface drainage and to reconstruct athletic fields	$840,000	Estimate a need for additional 3 - 4 months of construction duration. Use 3.5 mos. Includes Turner, KVA and OMR Const. Admin and GR costs
Replacement of Fields - Finished Athletic Fields	$5,998,677	One football field with lights and bleachers. Three new baseball fields. Irrigation system for all. Include restroom facilities on athletic field site and feeds for Transportation facility.
Feeder and Utility Size Increases for Alt Gym and Athletic Field Improvements	$200,000	Estimate over existing budget for these items and changes to Model School Switchgear and utility services sizing.
Contingency on Hard Construction Costs	$575,352	Utilize 5% for these items and Geotechnical Items

Increased Soft Cost items

Additional Soft Cost Items		
4.0% Design Fees	$2,799,366	Entirely new design work needed to produce CCHS MS.
Complex Site Design Premium	$700,000	Need to design all the storm water drainage, geotechnical engineering, site utilities, parking lots, access roads, permitting drawings to put model school design onto the existing athletic field site. Additional design services to feed new athletic fields and Transportation Center.
Value of Existing Design Work Lost	$3,489,000	Write off of the total of OMR, KVA, and TCC through 9/14. No reuse of existing plans.
Increased CM Fees on incremental work	$419,712	Fees calculated at 3% of incremental hard costs

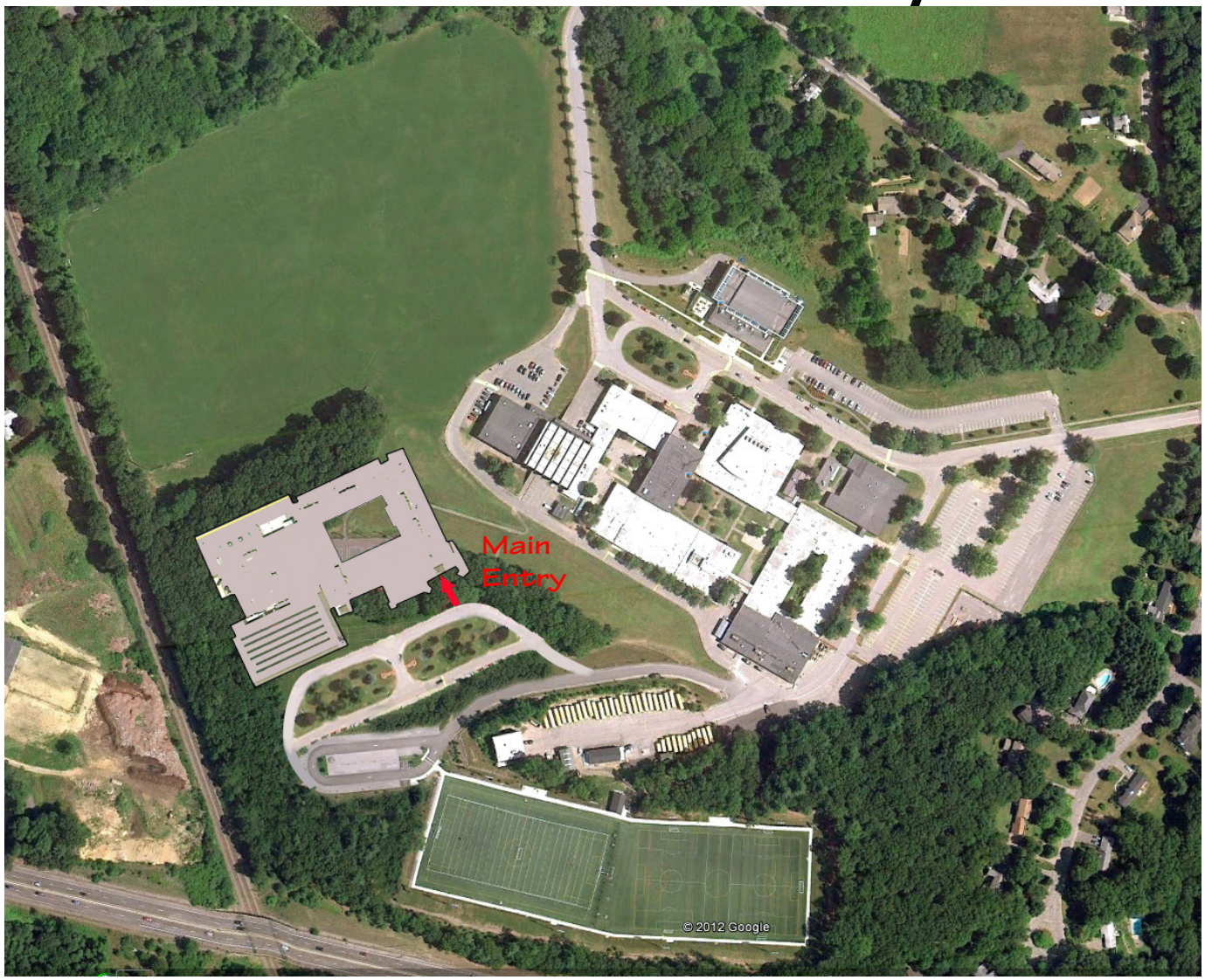
Hudson-on-the-Field Cost Summary

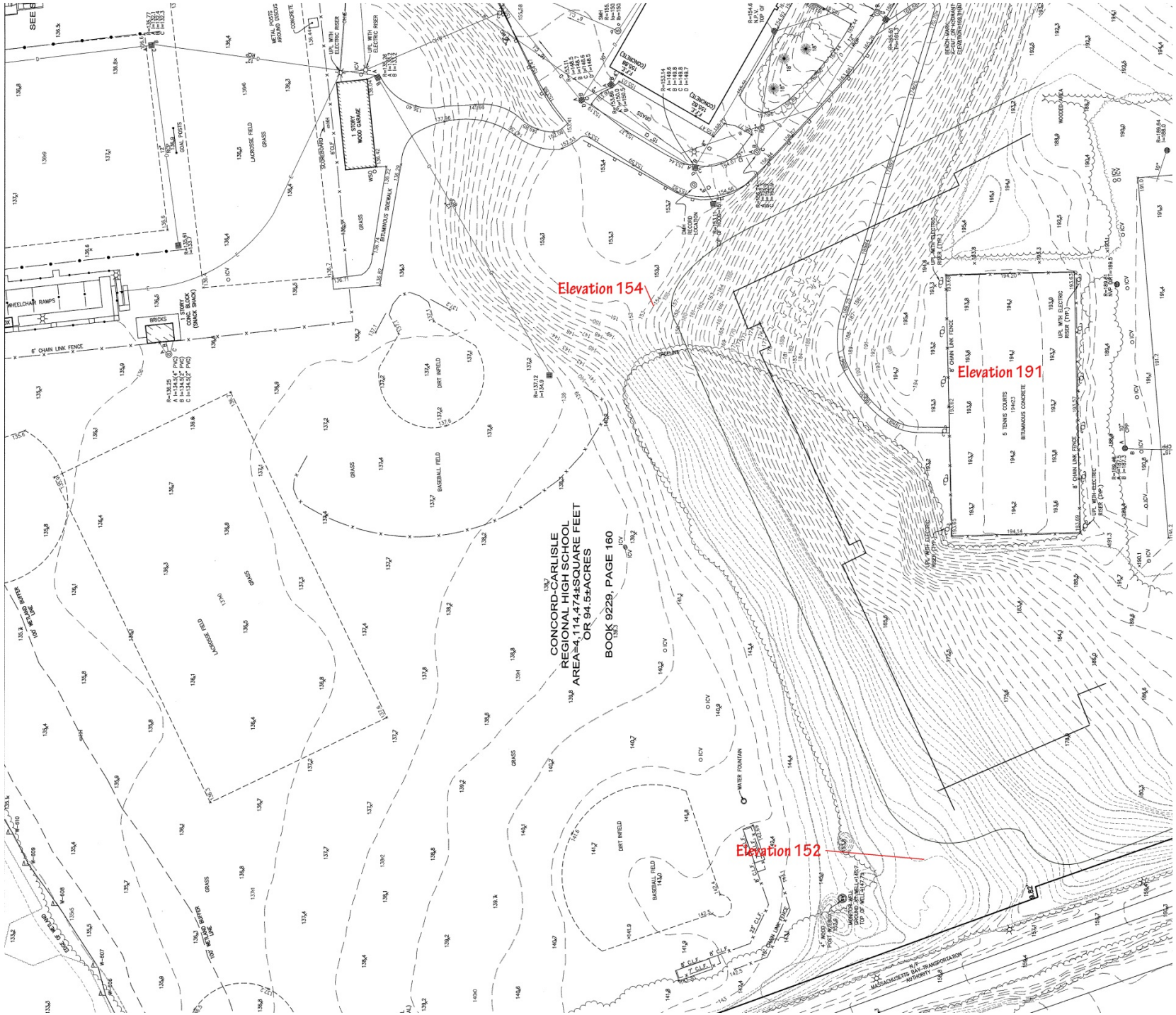
Existing Design	236,936 GSF	x	$316.50/GSF	=	$74,989,918
CCHS MS Academic Building	237,936 GSF	x	$307.10/GSF	=	$69,984,146
Sq ft for second gym included					
Less: 5.0% Additional Reimbursement					-$ 3,499,207
Less: not replacing Bus Depot					-$ 1,500,000
					$ 64,984,938
Add Geotechnical Items					$ 5,526,356
Add Hard Cost Items					$ 8,464,029
Add Soft Cost Items					$ 7,408,077
Total for CCHS MS on Athletic Field Location					$ 88,624,949

A cost increase of…. $14,479,482

With no $$$ attributable to the Broad Reaching Assumptions list

WH-On-the-Hill Layout




Elevation 154
Elevation 191
Elevation 152
CONCORD-CARLISLE
REGIONAL HIGH SCHOOL
AREA=4,114,474±SQUARE FEET
OR 94.5±ACRES
BOOK 9229, PAGE 160
1 STORY WOOD GARAGE
1 STORY BRICK SNACK SHACK
WHEELCHAIR RAMPS
BRICKS
6' CHAIN LINK FENCE
BITUMINOUS SIDEWALK
GOAL POSTS
LACROSSE FIELD
GRASS
DIRT INFIELD
BASEBALL FIELD
5 TENNIS COURTS
BITUMINOUS CONCRETE
8' CHAIN LINK FENCE
WATER FOUNTAIN
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
SEE SHEET 3

WH-on-the-Hill Cost Summary

Existing Design	236,936 GSF	x	$316.50/GSF	=	$74,989,918
CCHS MS Academic Building	237,936 GSF	x	$307.10/GSF	=	$69,984,146
Sq ft for second gym included					
Less: 5.0% Additional Reimbursement					-$ 3,499,207
Less: not replacing Bus Depot					-$ 1,500,000
					$ 64,984,938
Add Geotechnical Items					$ 10,548,637
Add Hard Cost Items					$ 4,558,532
Add Soft Cost Items					$ 7,491,581
Total for CCHS MS on Athletic Field Location					$ 87,583,688

A cost increase of…. $12,593,770

With no $$$ attributable to the Broad Reaching Assumptions list

Geotechnical Issue Costs

Existing Soils Conditions need Remediation and Surcharge Loading		
Scrape Site to Elev 191	**$114,489**	28,800 cu yd of cut and placed materials
Bring in surcharge Materials	**$7,321,600**	228,800 cu yd Surcharge materials to elevation of +20ft. above elevation 191
Leave Surcharge Materials in place for 9 months.	**$690,000**	Cost of maintaining Slopes, erosion controls, geotechnical monitoring, survey work, borings, etc.
Escalation Budget Increase for Surcharge Duration	**$1,350,000**	Cost of Escalation for postponing construction start on building. These are incremental to the escalation numbers in the current budget.
OPM and CMR Incremental Costs	**$558,000**	Costs to maintain the OPM and CMR project teams during surcharge timeframe. Assume designers are designing site work, etc. during this timefreme.
Remove the top surcharge load	**$514,548**	76,267 cu yd surcharged removed. 152,533 cu yd remain on site.

Increased Hard Cost items

Additional Hard Cost Items		
Retaining Walls	**$2,850,000**	Necessary to hold soils and keep Athletic Fields usable. Walls on three sides.
Longer Construction Cycle for Site Preparations due to larger foundation scope, subsurface drainage and to reconstruct athletic fields	**$1,080,000**	Use 4.5 mos. Includes Turner, KVA and OMR Const. Admin and GR costs
Contingency on Hard Construction Costs	**$628,532**	Utilize 5% for these items and Geotechnical Items

Increased Soft Cost items

Additional Soft Cost Items		
4.0% Design Fees	**$2,799,366**	Entirely new design work needed to produce CCHS MS.
Complex Site Design Premium	**$750,000**	Need to design all the storm water drainage, geotechnical engineering, site utilities, parking lots, access roads, permitting drawings to put model school design onto the existing athletic field site. Additional design services to feed new athletic fields and Transportation Center.
Value of Existing Design Work Lost	**$3,489,000**	Write off of the total of OMR, KVA, and TCC through 9/14. No reuse of existing plans.
Increased CM Fees on incremental work	**$453,215**	Fees calculated at 3% of incremental hard costs