

**GREEN INTERNATIONAL AFFILIATES, INC.**

100 AMES POND DRIVE, SUITE 200 TEWKSBURY, MA 01876

T: (978) 923-0400 | WWW.GREENINTL.COM

PROJECT NAME KING COMMONS PEER REVIEW

DATE 10/27/2023

UPDATED:

PROJECT NO. 22015.1806

Peer Review Comment Form

NO.	SHEET NO.	SECTION	GREEN'S COMMENT	Applicant's RESPONSE	CONFIRMED BY	DATE
APPLICATION						
1		Form 1 application/Site Plan Checklist	Form 1 application and Site Plan Checklist are not included in the latest review materials. It appears that it was included in an older submission from 2022. We defer to the board if this needs to be resubmitted with the latest plans.			
SITE PLAN						
2	General Comment		There were no Master plan renderings in the latest submission. The latest proposed plans of the roadway do not match layout of the previously submitted renderings. Updated renderings should be provided to better understand the anticipated future development. Please provide.			
3	General Comment	§249-32.A.(1)(a)(ii)	There are no existing conditions plans in the plan set. Please provide existing condition plans. Please show existing utilities within Great Road and King Street.			
4	General Comment		Confirm all bends are real bend for the water lines. Please provide callouts for all proposed water line bends.			
5	General Comment	§249-32.D.(2)&(3)	Label existing and proposed surface in the profiles and show different linetypes for clarity (for example, show existing ground surface as thin line and proposed ground surface as bold). Freeze the line with deflection triangle for clarity. Please revise.			
6	General Comment		Label existing street names in C sheets for clarity. Please revise.			
7	General Comment		The plans do not callout what is being removed. Consider providing a demolition plan to clarify what is being removed and what is being retained from the existing site.			
8	General Comment		There are many stubs for future water connections but there are no callouts for caps. Please revise to include callouts for caps. Will stubs be filled with water or will they be empty and closed at the valve?			
9	C-4	§38-16.C.3	A delineation and number of square feet of the land to be disturbed should be added to the plans. Please revise.			
10	C-4	§38-16.C.7	Location of material stockpile areas should be added to the plans. Please revise.			
11	C-5-C-8		A typical dimension should be added for each road to confirm the aisle width on each of the layout plan sheets. Please revise.			
12	C-5	§173-32.B.	The plans show the provided parking spaces but it does not show the required parking area requirements. This should be added to the plans to confirm adequate parking is provided. Please revise.			
13	C-5	ADA/MAAB	C-5 mentions that ADA parking spaces will be determined upon further site development. The layout plans currently do not specify any ADA parking spaces. Please clarify where ADA parking will be located for future development and explain why there are no ADA parking spaces currently proposed.			
14	C-5	§249-43 E.(4)	Please provide a callout to indicate the first tree to be placed 25' min from intersection.			

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15	C-5		Taper to develop turn lane should be 1/2L per MUTCD L=WS at a 20 mph speed and 11' shift, taper should be 110'. Please confirm this is provided.			
16	C-5 - C-8	§249-73	Please confirm the curb at intersections extends an additional 3' beyond the end of the radius.			
17	C-5 - C-8		There is no sidewalk detail for wheelchair ramp with grass strip. Please add MassDOT Standard Detail E107.6.9 or a detail similar to it.			
18	C-5 - C-8	§249-73	Median curb should be sloped edging per Town requirements. Please revise.			
19	C-5 - C-8		Provide detail for median pedestrian refuge locations, this is not covered by the current wheelchair ramp details provided. Please revise.			
20	C-5 - C-8		Horizontal alignment information such as curve radii, points of curvature and tangency, and tangent bearings should be added to the plans for layout purposes. Please revise.			
21	C-6	§249-43 E.(1)	Provide low maintenance ground cover in the center of the roundabout circle. Please revise.			
22	C-7	NCHRP 672 Exhibit 6-9	A roundabout this size should accommodate an SU-30, at a minimum a Town of Littleton fire truck should be able to make a full u turn within the roundabout. Consider providing a drivable concrete apron for large vehicles to utilize. Please provide and confirm turning movements of a fire truck and an SU-30.			
23	C-7		Consider widening out the southeast curb radii to be larger than 7', this may be a difficult right turn for larger vehicles.			
24	C-7 & C-8		For ramps at the driveway intersections within King Street, Wheelchair Ramp Type A detail does not cover this situation appropriately, provide MassDOT Standard Detail E107.6.4 for these locations. Please revise.			
25	C-8	§249-43 B. (1)	Minimum centerline radius is 95' per MassDOT PDDG for non-superelevated roads with +2.0% cross slopes. Please revise centerline at the curves on this sheet to meet this minimum.			
26	C-9	§249-43 B.(2)	Town requires a maximum vertical slope of 5% for collector streets. Given the roadway typical section provided is intended to meet the Town requirements for a collector roadway, should the profile also meet these standards?			
27	C-9		Profile grade at beginning of profile should match existing ground in order to match into the Great Road edge of pavement. Please revise.			
28	C-9	§249-81 D.	Sidewalks shall have a minimum longitudinal slope of 4.5%, based on the profile the longitudinal slope will be 10% max at the beginning of the project. Please clarify.			
29	C-9 - C-16		Horizontal alignments are difficult to see and read on this sheet. Consider also showing them on the Layout Plans. Also, provide station equations at intersecting alignments to aid in the vertical profile layout. Please revise.			
30	C-9 & C-16	§249-43 D.(14)	Town requires a minimum tangent length of 40 feet prior to an intersection after/before a vertical curve. Please revise the profile at these tie in locations on Great Road and King Street to provide this distance.			

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31	C-9		Where does the area north of the proposed sidewalk drain near station 12+25L? What are the limits of the existing curb removal? Please clarify.			
32	C-9		What is the type of outfall for WQU-66? Is it flared end or riprap? Please show on plan.			
33	C-9		The plans need more grading at the rain garden area at northeast side around STA 11+00 . The plan doesn't show the depth of rain garden or how contours match back into existing contour around it. Please revise.			
34	C-9		We observed large existing trees where the rain garden is proposed during our site visit. Will the trees be replaced/replanted? Can the rain garden be installed without or limited impacts to trees?			
35	C-9		How does the water line tie in near STA 10+20? Will there be a tapping sleeve and valve or cut in tee? There is also no valve shown near the tee. Consider providing three valves (two on the main and one on the service) to limit future shut downs. Has coordination with DPW on preferred connection type and number of valves at the tee been done?			
36	C-9		The gas line and water line are tied to same dashed line near STA 10+20? Please revise to tie into the correct lines.			
37	C-9		The existing catch basin neat STA 11+00 RT ties into an existing drainage system. It is not clear where this system outfalls and if any of this system is being maintained. The existing catch basin is in a low spot and should be maintained or grading should be revised. Please clarify.			
38	C-10		Profile missing sag curve information. Add information to this sheet for each vertical curve. Please revise.			
39	C-10		Proposed contours should be labeled. Please revise.			
40	C-10		Confirm 10' minimum separation between parallel laterals of proposed water and sewer lines.			
41	C-10	§249-32 D. (6)	Proposed water lines should be added to the profile. Please revise.			
42	C-10		Crossing utilities should be added to the profile. Please revise.			
43	C-10		Based on the profile it appears the catch basins are not at the low points. Please confirm and revise to make sure they are located at the low points.			
44	C-10		Provide drain and sewer pipe size and material in profile. Please revise.			
45	C-11 & C-13		Show profile slope on profile view. Please revise.			
46	C-12		The proposed Drain manholes DMH-17, DMH-14 and DMH-11 are on top of the crown of the road which is not recommended. We suggest to move the drain manholes off of the crown.			
47	C-13		Is there a water line in King Street that the 8" stub can connect to on C-13 & C-15? It is better for the system to be looped than to have a dead end. Please confirm.			

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48	C-16		DMH-17 has 4 pipes entering the drain manhole with angles less than 90 degree. The details indicate a standard 4' inside diameter manhole. Please confirm that the DMHs proposed do not require larger diameter manholes to accommodate the pipes.			
49	C-23		There are no curb cuts, stormwater BMPs, and drainage system to accommodate any of the other sites. What are future plans for the other sites and how will they tie into the infrastructure proposed?			
50	C-24		The typical application of MUTCD Figure 6H-3 will not be sufficient to cover the work at the entrance on Great Road given the existing shoulder is only 2' wide. Verify required work zone width at Auman Rd entrance. Figure 6H-6 may be more appropriate for this situation. Please revise.			
51	C-24		Typical Applications for middle lane closure such as TA-30 should be added for sewer work to be installed on King Street. Please revise.			
52	C-25		Sewer Doghouse manhole detail is missing. Please provide.			
53	C-25		Water quality unit detail is missing. Please provide.			
54	C-27	§249-43 E.(8)	Specify tree species as defined in Town regulations §249-43 E.(8) on detail sheet for tree planting. Please revise.			
55	C-27	§249-43 E.(9)	Specify minimum 3" caliper trees in tree planting detail. Please revise.			
56	C-27	§249-43 E.(10)	Specify 6" loam where trees are planted from back of sidewalk to the limit of work. Please revise.			
57	C-19,C-27		There are two details for erosion control barrier shown on the detail page, "erosion control barrier" and "siltsoxx perimeter erosion barrier" detail. It appears only the "perimeter erosion barrier" is called out on the plans. Where is the "erosion control barrier" being used? Please clarify.			
58	C-28		Please revise Wheelchair Ramp Type B detail to match curb transition shown in MassDOT standard detail E 107.6.0 to show transition curb ending at front of the detectable warning panel.			
59	C-29	§249-73	Collector Road Typical Section should show Type VA-4 Granite Curb instead of Type VA-6 Granite Curb per Littleton Standard Details. Please revise.			
60	C-29	§249-81.B.	Concrete Sidewalk detail should show 8" Gravel Borrow, Type B to match included Town's typical section for collector road. Please revise.			
61	C-29	§249-66 E.	The max slopes on the Collector Road Typical Section should be specified. Please revise.			
62	C-29		Please revise Vertical Granite Curb detail to match MassDOT Standard Detail E106.3.0.			
63	C-29	§249-81 D.	The sidewalk minimum width of 5'-0" should be specified on the Concrete Sidewalk detail. Please revise.			

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64	C-29		There are no plantings are shown in the plans for the rain garden. The detail indicates native plantings and to see the plans. Please revise to show the plantings in the plans.			
65	C-29		Please explain the purpose of the impermeable liner on the sides of the rain garden.			
66	C-29		For the rain garden it notes minimum 1' separation to seasonal high groundwater. It should have a minimum of 2' separation to seasonal high groundwater. What is the ESHWT at this location?			
67	C-29		The typical concrete easement of sanitary sewers or storm drains detail has text on the right side that are cut off. Please fix.			
68	C-30 - C-56	§249-66 E.	Show slopes off back of sidewalk on sections to confirm they are less than or equal to 3:1 in fill and less than or equal to 4:1 in cut per Town regulations. Please revise.			
69	C-30 - C-56		Sidewalk detail shows max of 7.5% for wheelchair ramp slope but sections show 7.7%. Please revise sections to show 7.5%.			
ZONING BYLAWS						
70		§173-18.D.	Adequate access to each structure for fire and service equipment shall be provided. Please coordinate with the Littleton Fire Department to confirm adequate access.			
71		§173-28 Street frontage exception	A zoning table should be added to the plans to show the "provided" and "required" information associated with the street frontage exception requirements. Please revise.			
72		§173-31 Intensity of Use Schedule	A zoning table should be added to the plans to show the "provided" and "required" information associated with the intensity of use schedule requirements. Please revise.			
STORMWATER REPORT						
73	General Comment		Has there been a drainage analysis performed to confirm the spread and HGL of the proposed closed drainage system? Did the drainage analysis account for all the area that will enter the closed drainage system or just the area within the limit of work?			
74	General Comment	Methodology	The Methodology section refers to the City of Haverhill requirements. Please revise.			
75	General Comment	§38-17.C.5	Estimated seasonal high groundwater elevation (November to April) in areas to be used for stormwater retention, detention, or infiltration. The report and plans do not indicate seasonal high groundwater or if test pits have been performed. Please clarify.			
76	Page 6:Regulatory Compliance		The project is mentioned to be a redevelopment project with 35,475 sf of new development and notes that the site only needs to meet the standards to the maximum extent practicable because it is a redevelopment project. This is incorrect the project is a mix of redevelopment and new development. The new impervious area needs to fully meet the standards. Please revise.			
77	Standard 2: Peak Rate Attenuation		The proposed peak rate is 12.93 cfs for DP-1 for the 2 year storm which is higher than existing peak flow of 12.75 cfs. This does not meet the peak rate requirement. Please revise.			

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78	Standard 3: Recharge		Most of the site according to NRCS Soil resource report is 656 (unknown hydraulic group), but the narrative mentions "The NRCS Soil Resource Report indicates that the site is comprised mostly of hydrologic group C/D soils". The narrative mentions "70% over group D soils (24,833 SF)". The neighboring soils are A, B, and C/D. Was testing done to confirm soil type? Please confirm the soils are actually D soils, otherwise the recharge requirement could be much larger.			
79	Required Recharge Volume		The required recharge volume is not met. The proposed rain garden infiltrates 6,180 CF of runoff which is 97% of the required 6,386 CF. 100% of required recharge volume has to be infiltrated. Please revise.			
80	Recharge		Drawdown calculations for the rain gardens are missing. Please provide.			
81	Standard 4: Water quality/C-9		Is WQU-65 noted in the plan the same as noted WQU-1 noted in the report? Please use consistent naming.			
82	Standard 4: Water quality		It is noted that the existing stormwater pond has an unknown WQV capacity. This is an above ground system and should be surveyed to confirm the capacity. If it is being utilized, it should be modelled in HydroCAD. Please revise.			
83	Standard 4: Water quality		The narrative indicates that there is an existing stormwater pond but the plans show this is flagged as a wetland. Please confirm if this is a wetland or an existing stormwater pond.			
84	Standard 4: Water quality		The recharge calc says the rain garden treats 6,180cf but the Standard 4: Water quality section mentions "The proposed rain garden holds a total WQV of 2,853 CF". The HydroCAD calcs indicate 2,853 cf. Please clarify.			
85	Standard 4: Water quality		New Impervious area needs to fully meet the requirement. Please provide calc showing the required water quality volume for the increase in impervious area as well.			
86	Table 3: Water Quality Unit Summary		WQU-1 treatment capacity is 6.5 cfs whereas the peak flow is 38.75cfs for the water quality storm event. The WQU appears to be undersized and does not have a bypass manhole. Will it function properly?			
87	Table 3: Water Quality Unit Summary		WQU-2 treatment capacity is 0.9 cfs but the peak flow is 2.84 cfs for the water quality storm event. The WQU appears to be undersized. Please clarify.			
88	Watershed Plans	§38-17.C.6.	The existing and proposed vegetation and ground surfaces with runoff coefficients for each should be shown on the watershed plans. Please revise.			
89	Watershed Plans		How does the area in EX-5 get to DP-1? The closed drainage system does not appear to discharge to the existing stormwater pond. Please clarify.			
90	Watershed Plans		DP-1 stormwater pond is surrounded by higher elevation on the northeast side and a highway ramp at the northwest side. Please confirm if this stormwater pond has an overflow or an outlet.			
91	C-4, Watershed Plans		The watershed boundary near the island close to Great road is not accurate. The boundary should be drawn perpendicular to the contours to show what will actually enter the catch basins and what will bypass. Please revise.			
92	Post Development Watershed Plan		How does the area southwest of PR-1 get to the rain garden? It looks like it would runoff on to Great road. Please clarify.			
93	Post Development Watershed Plan		All of the area on the southwest side of PR-2 and the area north of PR-7 runs onto the site. These areas need to be accounted for and modeled in HydroCAD. Please review and revise all watershed boundaries to include areas that run onto the site.			

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94	Post Development Watershed Plan		Proposed drainage should be shown on the Watershed figure for clarity. Please revise.			
95	Post Development Watershed Plan		Where does the stormwater runoff go for the parking lot between PR-6 and PR-9? Please clarify.			
96	HydroCAD		The HydroCAD model shows a 12" round culvert, 6" orifice, and 24" grate for the rain garden outlet that are not shown on the plans. Please revise.			
97	Hydrodynamic Separation Product Calculator		CDS 2025-5 is listed in Contech's calcs but CDS 3035-6 is noted in the water quality calcs. The plans do not have a detail indicating the model. Please revise to provide consistent naming.			
98	Hydrodynamic Separation Product Calculator		For WQU-1, the water quality calcs indicate a 38.75 cfs peak flow rate for the water quality storm event but the chart only goes up to 14.58 cfs flowrate with a treated flow rate of 1.6 cfs. Please explain why the chart only goes up to half the flowrate. Does the internal bypass have capacity for these follows?			
99			CDS stormwater treatment system typical detail shows an offline layout with a bypass manhole but the bypass manhole is not shown on the plans. It appears the manufacturer recommends an offline system with a bypass manhole. Please clarify.			
100	Riprap sizing		For proposed outfall #1, Rip rap should be shown on the plans with sizes and dimensions based on calculations. Please revise.			
101	Illicit discharge statement		Illicit discharge statement should be signed. Please sign.			
O&M Plan						
102	O&M		Rain garden is not included in the O&M. Please include in the O&M plan.			
103	O&M		Street sweeping schedule refers to the City of Haverhill. Please revise.			
104	O&M	Stormwater Checklist/\$38-18.B.3	The O&M plan shall include the signature(s) of the owner(s).			
Sewer Plan						
105	C-9 through C-16		A vertical scale should be included for each profile.			
106	C-9 through C-16		The proposed manhole rims in profile view are not shown at grade. Please revised.			
107	C-9		SMH-1-1 is shown with less than 4 feet of cover over the sewer which is a concern. Consider making it deeper.			
108	C-9 through C-16		There are numerous stubs for future connections (P-1-1, P-1-3, P-1-11, etc.). A call out for a cap at the end of each stub is missing. Please revise.			
109	C-10		There is no north arrow on the plan view. Please add.			

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110	C-10		The section of profile to the left of Station 15+00 is already shown on C-9. Delete this section from C-10.			
111	C-10		The section of profile to the left of Station 15+00 is already shown on C-9. Delete this section from C-10.			
112	C-11		What flow will be entering the proposed collection system at the tie in to the existing SMH? Are P-1-14 and the downstream pipes sized adequately for this flow?			
113	C-11		Label for P-1-12 is missing on the plan view. Please revise.			
114	C-11		SMH-1-6 seems unnecessary. Can it be eliminated and SMH-1-5 connected directly to SMH-1-7?			
115	C-11		There is a pipe shown leaving SMH-1-7 in the profile view that does not exist in the plan view. Please delete.			
116	C-11		SMH-2-1 is shown with less than 4 feet of cover over the sewer which is a concern. Consider making it deeper.			
117	C-11		Why is there a 0.9' drop in SMH-2-1? Please revise.			
118	C-11		The section of profile to the right of Station 24+50 is already shown on C-12. Delete this section from C-11.			
119	C-12		P-2-2 is not shown in the profile. Please revise.			
120	C-11		The invert out at SMH-2-6 should be 0.1' below the invert in. Please revise.			
121	C-11		The section of profile to the right of Station 28+00 is already shown on C-13. Delete this section from C-12.			
122	C-13		P-2-13 is shown with less than 4 feet of cover over the sewer which is a concern. Consider making it deeper.			
123	C-13		The pipes entering SMH-2-9 and SMH-2-10 are not shown. Please revise.			
124	C-13		The invert out at EX-SMH-S16-1 is roughly 270.19. Please fix depth of manhole in profile. There should be an internal drop connection from the proposed P-2-21 into the existing manhole. Also, please show the existing manhole in a different color than the proposed infrastructure (i.e. light gray).			
125	C-14		SMH-1-5 is missing in the profile. Please revise.			
126	C-15		P-1-14 is not shown connecting into SMH-1-17 in the profile. Please revise.			
127	C-15		Add King Street label to plan view.			
128	C-15		Recommend tying into the sewer on King Street at S15-1 or S15-2 instead of installing a doghouse manhole.			
129	C-17		Recommend inserting a column into the Sewer Pipe Data tables which indicated the sheet number that each pipe segment is shown on.			

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130	C-17		A 9" sewer pipe is not typical. Consider switching all 9" pipes to either 8" or 10".			
131	C-17		All sewer pipes should be PVC.			
132	C-17		The inverts in to SMH-1-8 all need to be at least 0.1' above the invert out. Please revise.			
133	C-17		The invert out of SMH-2-6 should be 0.1' below the invert in. Please revise.			
134	C-17		The "station to" is missing for P-1-11. Please revise.			
135	C-17		The slope of P-1-13 is 0.006 based on the inverts. Please revise.			
136	C-17		The slope of P-2-1 is 0.021 based on the inverts. Please revise.			
137	C-17		The slope of P-2-3 is 0.006 based on the inverts. Please revise.			
138	C-17		The slope of P-2-4 is 0.006 based on the inverts. Please revise.			
139	C-17		The slope of P-2-13 is 0.006 based on the inverts. Please revise.			
140	C-17		The slope of P-2-15 is 0.021 based on the inverts. Please revise.			
141	C-17		The slope of P-2-17 is 0.021 based on the inverts. Please revise.			
142	C-17		The slope of P-2-20 is 0.021 based on the inverts. Please revise.			
143	C-17		The slope of P-2-21 is 0.007 based on the inverts. Please revise.			
144	C-17		The pipe location for P-1-14 should be Existing SMH to SMH-1-7 based on the design. Please revise.			
145	C-17		The pipe location for P-1-15 should be SMH-1-7 to SMH-1-8 based on the design. Please revise.			
146	C-17		The pipe location for P-1-17 should be SMH-1-8 to SMH-1-9 based on the design. Please revise.			
147	C-17		The pipe location for P-1-21 should be SMH-1-9 to SMH-1-10 based on the design. Please revise.			
148	C-17		It's recommended that the pipe location for all pipes that are stubs for future connections should be expressed as "Stub into SMH-X-X". Please revise. List of pipes that this would apply to: P-1-1, P-1-3, P-1-5, P-1-6, P-1-8, P-1-9, P-1-11, P-1-16, P-1-18, P-1-19, P-1-20, P-2-1, P-2-5, P-2-6, P-2-9, P-2-10, P-2-12, P-2-14, P-2-16, P-2-18, P-2-19			