Developer/Engineer Checklist for Projects Involving Town of Hillsborough Water and Sewer Utilities

Project: _____

Developer/Owner: _____

Design Engineer:/Inspection Firm: _____

Contractor: _____

The list may not be all inclusive depending on nature of project. *W column is for one-year warranty check to release bond or letter of credit.*

CONCEPTUAL PLANNING/DESIGN/CONSTRUCTION			
	Topic	**W**	**Description**
1	Capacity		Owner/Engineer has preliminarily discussed development plans with utilities and ensured available capacity. A capacity inquiry does not reserve capacity for the project. Capacity is not confirmed until the town signs off on plan approval and permits or an agreement that reserves capacity. Capacity is granted if available and on a first come/first serve basis.
2	Planning		Owner has discussed project with town planning and utilities department for direction and determined the project is allowable under what conditions and process and owner desires to proceed.
3	Planning		Projects outside the TOH water and sewer service area cannot be served without Board of Commissioners approval AND a modification of a multi-party intergovernmental agreement, if authorized by the Board, regarding the boundary area. This will likely take several months.
4	Planning		Projects within the water and sewer service area, but outside of town, may require an offsite water or sewer extension to be served. This effort is at the cost of the owner. Additionally, the Board of Commissioners will want to provide input on annexation. Parcels that are contiguous to town limits are most favorable.
5	Planning		Projects within the water and sewer service area, and inside of town that do not have water and sewer abutting the parcel, may require an offsite water or sewer extension to be served. This effort is at the cost of the owner.
6	Planning		Projects having water and sewer abutting the parcel will require evaluation by an engineer about the feasibility of serving the planned units within the parcel. The town will provide data about the abutting infrastructure and a good place to tap but will not conceptually design or suggest the layout inside the parcel.
7	Planning		The town is not favorable to any type of pumping station. Projects will likely not be accepted by the Board if they are not in the town's interests and involve a pumping station.
8	Planning		Projects generally commercial in nature will require cross connection control, the type depending on degree of hazard. Cross connection is covered in Chapter 15 of the town code and in the town Technical Specifications for Water and Sewer Systems. Private systems, fire lines, irrigation systems, swimming pools, and most all commercial projects will require backflow prevention. For redevelopment, any existing backflow preventer may be required to be upgraded.
9	Planning		Food service establishments and other fats, oils and grease generating facilities will require a grease interceptor or oil-water separator. The town Utilities System Infrastructure Protection Supervisor will provide guidance on the requirements.
10	Utility Easements		Owner is responsible for acquiring any utility easements required for the project. Projects dedicated to the town will require a utility easement agreement be executed and recorded with the Orange County Register of Deeds.

11	Plan Review		If planning requires the "TRC" process, Utilities will be one of the reviewers. However, if only site plans are submitted, full utilities plans will need to be reviewed and approved separately by the utilities department. Each review through TRC or separately is subject to Utilities review fees.
12	Plans		A North Carolina-registered PE seals the plans prepared under their direction. Plans shall be in accordance with state requirements for the design of water and sewer systems and also TOH standard specifications and details. Plans shall be submitted electronically to Utilities along with one full size hard copy and one ½ size copy.
13	Specifications		A North Carolina-registered PE prepares the specifications. For small projects, the specifications may be part of the plan set. Note the TOH standard specifications are generally a materials specification and preferences beyond state design criteria. Thus, project specifications need to address ancillary items such as trenching, backfill, shoring, pipe laying, etc.
14	Permits		The Owner will prepare permit applications to the state in their name. Utilities will provide the engineering information for the water system permit application and letter to serve. Utilities will provide the sewer permit number information for the application and the flow acceptance form. If the project is dedicated to the town, the town will then complete a change of ownership form for the state permits to be transferred. If there are public and private system components requiring state permits, these shall be prepared under separate applications.
15	Encroachments		The Owner or Engineer shall prepare Encroachment Agreement applications for work on NCDOT right-of-way and roads. The town will sign Tri-Party Encroachment Agreements.
16	Agreements		For development projects anticipated to be dedicated to the town, the Owner will be required to execute with the town, a Water and Sewer Extension Contract (WSEC). This WSEC describes and sets out the terms for the project in anticipation of future town ownership of the water and sewer system.
17	Fees		Projects are subject to system development, tap, meter and review fees as outlined in the Utility Fees sheet on the town website under Utilities Department. Utilities generates the invoice after plan approval.
18	Fees		System development fees are charged to any new or redeveloped parcel unless the connecting system was built with grant funds or there is record the parcel paid the development fees in the past. For reference, town system development fees were not established until the early 1990s.
19	Approval to Construct		Prior to town sign off on construction or building permits, fees and applicable state and NCDOT approvals must be in hand as well as approved drawings. The selected contractor must be licensed in NC to do the type of work being performed.
20	Pre-Construction		Prior to construction, Utilities must meet with construction team. Construction team to provide informal schedule for construction, share contacts for general contractor and main subs, and discuss expectations for the project.
21	Construction		During construction of large projects with an executed WSEC, the owner is required to have third-party construction observation of meaningful water and sewer work. The town is not the full-time inspector of the project. The competent third-party construction observer (inspector) is required to prepare daily reports and submit them to the town weekly.
22	Construction		The contractor or project inspector shall notify the town inspector 48 hours in advance of any acceptance testing or taps.
23	Construction		Utilities shall be notified of any project field changes involving water and sewer and approve of such changes.
24	Construction		The town would like to be included on progress meetings, if held.
25	Construction		The town should be kept aware of schedule to be sure it's ready to sign off for certificates of compliance with Orange County.

UTILITIES DEDICATION/PRE-ACCEPTANCE/WARRANTY INSPECTION (Items with X in W column)

	Topic	**W**	**Description**
1	Admin/Drawings		Record drawings received.
2	Admin/Drawings		Record drawings indicate they are as-builts on the cover sheet and on each sheet's revision block and are sealed and signed by a NCPE.
3	Admin/Drawings		Record drawings appear to depict as-built features, including known field changes, wrt location, manhole inverts, slopes, and other field data. Changes should be in the form of strikethroughs from the design with the field numbers next to it.
4	Admin/Drawings		Record drawings do not show anything noted as Proposed, Temporary or To Be Removed, etc.

5	Admin/Drawings		Record drawings depict features in conformance with town and state approved plans and standards (pipe slope/minimum cover, manhole diameters/depth, location of hydrants, valves, blow offs, etc.).
6	Admin/Drawings		Record drawings submitted in hard copy and electronic format.
7	Admin/Drawings		Developer/owner contractor letter indicating all changes reflected on redlines provided to engineer.
8	Admin/Field Data		As-Built Digital Submittal Requirement data provided electronically.
9	Admin/Field Data		Digital GPS data in correct format and all items captured.
10	Admin/Permits		Sealed Engineering certifications received for water and sewer, as applicable.
11	Admin/Permits		Engineering certifications sent to the state for approval and confirmation of receipt or approval is granted. High priority sewer lines are noted in certification.
12	Admin/Permits		Permit Change of Ownership Form submitted for town execution, as applicable.
13	Admin/Inspection	X	CCTV and Smoke Test reports received in hard copy and electronic format.
14	Admin/Inspection	X	Defects noted from CCTV and smoke testing addressed satisfactorily, including bad CCTV (too fast, blurry, defects not coded). Retest reports received.
15	Admin/Inspection	X	Acceptance testing reports received or confirmed (water pressure/leakage/chlorination/bacteria and sewer pressure/leakage/vacuum/mandrel) and repeat reports after fixing defects.
16	Admin/Inspection		If waiting 30 days for mandrel testing is waived, submittal of backfill test report showing 95% maximum density compaction.
17	Admin/Inspection		Third party inspection reports provided for entire project.
18	Admin/Inspection		Backflow test reports, as applicable, received and passing.
19	Admin/Inspection		Grease interceptors/oil-water separators/bar screens or grinders installation approved by Utilities Infrastructure Protection Supervisor, as applicable.
20	Admin/Inspection		For any structural features, like aerial main piers requiring a sealed structural design, test results for concrete and foundation provided.
21	Admin/Easements		Easements are documented in an easement agreement or on RECORDED plat in name of Town of Hillsborough and denote Utility Easement per spec.
22	Admin/Dedication		Letter request from developer/owner asking the town to accept the system received.
23	Admin/Dedication		Developer/owner contractor letter indicating lien waivers for them and all subs and material suppliers.
24	Admin/Dedication		Schedule of Values certified and submitted (total of only water and sewer related project costs).
25	Admin/Dedication	X	TOH provided access key or code for BFPs in riser rooms. Access still works upon warranty check.
26	Admin/Dedication		Developer provides warranty bond or Letter of Credit for % of project value. Percent determined by TOH (10% – 25%) depending on level of defects found in pre-acceptance evaluation. Date to begin upon BOC acceptance and last a minimum of one year or until released.
27	Field/Easements		Multiple pipes have 10’ clearance on each side of each pipe as can reasonably be observed.
28	Field/Easements	X	No landscaping or other obstruction/utility is planted within utility easements.
29	Field/Utility Separations		Three-foot separation from water mains to electric, phone, gas, cable, etc.
30	Field/Utility Separations		Water lines are a minimum of three feet deep or five-foot-deep when crossing under water bodies.

31	Field/Utility Separations		Sewer is a minimum of four feet deep and below water lines.
32	Field/Water Mains		Water mains are installed in locations as shown per plan (alignment and areas planned).
33	Field/Water Mains	X	No visible ground sags or water ponding along alignment.
34	Field/Hydrants		5 ¼ dry barrel by Clow (Medallion) or Mueller.
35	Field/Hydrants		12” clearance between edge of hydrant and sidewalk.
36	Field/Hydrants		6’ minimum from back of curb.
37	Field/Hydrants		10’ from edge of pavement in locations without a drainage ditch or behind the ditch.
38	Field/Hydrants		No hydrants in drainage ditch lines.
39	Field/Hydrants		Hydrant flange 2” – 6” above final grade.
40	Field/Hydrants		Storz connection is 24” – 36” from finished grade.
41	Field/Hydrants		Hydrant extensions do not exceed 1 foot.
42	Field/Hydrants		Hydrants are located per plan.
43	Field/Hydrants	X	Hydrants are secure, do not wobble when pushed. Nut is solid and hydrant opens easily.
44	Field/Hydrants		Hydrants in parking lots or other susceptible areas have 6” bollards specified painted yellow, 3000 psi concrete.
45	Field/Hydrants		Storz connection with chain intact.
46	Field/Hydrants		Hydrant nozzles are operable and produce expected amount of flow – all nozzles.
47	Field/Hydrants	X	Hydrants are painted red and free of paint defects.
48	Field/Hydrants	X	6” watch valves are present for each hydrant and are operable, they smoothly and completely isolate flow.
49	Field/Hydrants	X	Watch valves are in valve boxes that are plumb, level, at grade, not buried, free of debris, and have appropriately labeled lid (WATER). No water ponding or settlement around hydrant. Valve is not offset in box.
50	Field/Hydrants	X	Watch valve boxes in grassed areas have a concrete ring.
51	Field/Hydrants		FDC is installed between 24” and 36” above surrounding finished grade.
52	Field/Hydrants		Private hydrants are painted safety yellow.
53	Field/Hydrants		Private hydrants have a RP-Detector backflow preventer on customer side of property near connection.
54	Field/Valves		All mainline valves present as shown on plans – on all sides of tees and crosses, at each hydrant, every 1000 feet for long runs, nothing paved over.
55	Field/Valves	X	Isolation valves are in valve boxes that are plumb, level, at grade, free of debris, and have appropriately labeled lid (Water). Valves in traffic rated areas are H20 rated. No water ponding or settlement around valve boxes. Boxes are are not buried or paved over.
56	Field/Valves	X	Valves operate in a smooth fashion, and isolate flow completely. No hissing sounds. Valve key fits well on nut. Valve is not offset.
57	Field/Valves	X	Valves in non-paved areas have a concrete ring.
58	Field/Valves		Standard valve in valve box prior to all commercial meter vaults and water air release valves.
59	Field/Valves		Air release valves for water mains are in a 4’ eccentric manhole. Valves are 2” Vent-O-Mat series with trash hood. 2” gate valve to precede valve assembly in manhole. 2” copper from main to valve. Manhole 6’ minimum depth. 6” diameter drain to stone base with pipe cap.
60	Field/Valves	X	Air release valves are tested and appear to function.
61	Field/Flushing Device		Installed per plan - Kupferle Foundry 9800 Eclipse.

62	Field/Flushing Device		2” Neptune T-10 with auto-detect ARB and R-900 radio read for each flushing device.
63	Field/Blow offs		At end of all dead-end lines (as dead ends are allowable). 2” operable gate valve and valve box prior to blow off for 4” – 12” mains. Threaded coupling and standpipe 6” below finished grade in valve box with concrete ring. Valve boxes plumb, level, at grade with concrete ring, correct lid/cap. No settling or water ponding.
64	Field/BFP		BFPs present after all irrigation meters.
65	Field/BFP		BFPs present for private hydrant, fire lines and FDCs or proper type and size.
66	Field/BFP		BFP in ASSE 1060 enclosure .
67	Field/BFP		Reduced Pressure (RP) BFP present for severe hazard facilities. Double check valve assembly (DCVA) installed for non-severe hazard facilities of appropriate size.
68	Field/BFP		DCVA BFPs are epoxy coated including shut off valves.
69	Field/BFP		Location of BFPs is on customer side in location per plan.
70	Field/BFP		BFPs have concrete pad of adequate size.
71	Field/BFP		Exposed above ground piping is flanged DI or copper with compression joints and fittings.
72	Field/BFP		BFPs over 2.5 inches have concrete cradles or support blocks per detail.
73	Field/BFP		Test cocks are installed per manufacturer.
74	Field/BFP		Copper piping through concrete is sleeved at the concrete interface.
75	Field/BFP		BFPs specified in riser rooms have dedicated drain of equal size and adequate spacing around device (12” min for RP).
76	Field/BFP		BFPs in riser rooms are horizontal and have a separate door to the outside.
77	Field/BFP	X	Detector meter present and per town spec. Meter shows no usage.
78	Field/Fire lines		FDC location between 24” and 36” above grade. Location is appropriate.
79	Field/Fire lines	X	Strainer present prior to BFP and unobstructed.
80	Field/Fire lines		No domestic service tapped from fire service unless 6” and larger.
81	Field/Fire Sprinkler		Meter is installed or plumbed for ¾ x ¾ .
82	Field/Meter Box	X	Residential lids are cast iron with 2” pre-drilled hole, not broken, not buried.
83	Field/Meter Box	X	Residential boxes are black plastic boxes 12” deep with flared bottom. Boxes are plumb, level, at grade and not cracked or broken. No settling or water ponding around box.
84	Field/Meter Box	X	Commercial vault lids are hinged aluminum with pre-drilled 2” hole. Lids open freely and are in alignment with a slam lock and lifting handle.
85	Field/Meter Box		Commercial vaults have a bypass line with gate valve and restrained coupling starting at least 12” from walls, mainline with strainer, two gate valves before and after meter, and restrained dismantling joint.
86	Field/Meter Box	X	1” meter boxes are minimum 22” x 35” at base. Larger boxes are pre-cast concrete with drainpipe to daylight. Boxes are solid, with no leakage or cracks. Floor slopes to drain with debris screen. No standing water in vault, Penetrations are with link seal or a boot connection.
87	Field/Meter Box		Flanged DI or copper with compression joints/fittings evident for piping through vaults. Detail is followed.
88	Field/Meter Box		No residential meters are located in concrete.
89	Field/Meters		Meters located at right of way line on public side or within easement.
90	Field/Meters		Meters that are installed are <2” are Neptune T-10, 2” – 6” are Tru/Flow Compound and 8” – 10” shall be Neptune HP Turbine. All installed have radio read and auto-detect ARB.

91	Field/Meters		Residential meters have proper yoke (Ford Y502 for 5/8” and Y504 for 1”) and meter stop in box before meter and a double check valve after meter.
92	Field/Meters	X	Installed meters are level, connections are tight, free of leaks, register cover is not fogged or cracked, no water registered on meter unless an occupied residence or used as a contractor temp faucet.
93	Field/Meters		Observed contractor temporary faucets are placed a minimum of 10 feet from the meter box.
94	Field/Meters		Meter boxes have orange temp safety fencing around the meter area to protect the installation during home construction activities, as applicable.
95	Field/Meters	X	Flanged bronze strainers by Neptune before all 2” and larger meters with a spacer between strainer and meter. Strainer is unobstructed.
96	Field/Meters		Irrigation taps have separate meters.
97	Field/Meters		Grouped in pairs or more at adjoining property lines following meter location standard detail in plans.
98	Field/Meters		Maximum 12” below grade for residential.
99	Field/Water Services		Each parcel/unit has a water service.
100	Field/Water Services		No services cross other parcels as can reasonably be observed.
101	Field/Water Services		Minimum 1” service size as can reasonably be observed.
102	Field/Water Services		No more than 4 - ¾” meters on a 1” service line, 5 – 8 on a 1.5” service line and 9-16 on a 2” service line. See W-09 for allowances for 1” meters on various service line sizes.
103	Field/Water Services		Class K copper or Class 350 DI is evident to meter box.
104	Field/Water Services		Domestic service tapped from fire service only if fire service is 6” or larger.
105	Field/Water Services		Curb stop and valve box present before dual assembly meters, not buried. Box is plumb, level, clean, to grade with properly stamped lid. Boxes in non-paved areas have concrete ring. No settlement or water ponding around valve box.
106	Field/Sewer Prohibitions		If a grease or oil/water interceptor is installed, it is of approved volume and its installation per plan.
107	Field/Gravity Sewer		Depth is at least 4’ deep and below water lines unless approved otherwise per plan and as can reasonably be observed.
108	Field/Gravity Sewer	X	No ground settlement or water ponding along alignment.
109	Field/Aerial Sewer		Aerial sewer crossings denote 25-year flood elevation. Pipe seems to be above, not on bottom of ditch or creek.
110	Field/Aerial Sewer		Pipe is Mech-Lock Protecto 401.
111	Field/Aerial Sewer	X	Thrust collars/piers are located 36” away from edge of water body, plumb, level, no obvious defects, number and material per plan. Rip rap placed around collars/piers. No water ponding or settlement. Rip rap not washed away during warranty period.
112	Field/Manholes		Manholes are precast concrete with cast-in-place or pre-cast inverts.
113	Field/Manholes		Manholes have H20 frame and cover for traffic bearing areas.
114	Field/Manholes	X	Manhole structures are intact, plumb, level, not buried or paved over, exhibit no cracking, no leakage, no inflow/infiltration, are not holding water. They appear to be rotated and set correctly. Barrel sections are not offset.
115	Field/Manholes	X	Proper castings are present.

116	Field/Manholes	X	No more than 12” of concrete grade rings from the top of cone to bottom of the manhole ring. Warranty check due to road paving that may occur after pre-acceptance.
117	Field/Manholes	X	Manhole is to grade. No settlement, ponding of water, asphalt cracking or crumbling around ring, heaving, etc.
118	Field/Manholes		Channels and benches are neatly constructed.
119	Field/Manholes		Pipes entering the manhole are at the bottom of the channel and not protruding into the manhole as to catch debris on or beneath. Pipes are neatly cut flush and smooth.
120	Field/Manholes		Steps are not over influent pipes, are spaced no more than 16” apart, none missing, properly embedded.
121	Field/Manholes		5-foot manholes for piping deeper than 16 feet; 6-foot for pipes over 20 feet deep per spec.
122	Field/Manholes		Tops are min 18” above finished grade in unpaved areas not adjacent to roads (no grade rings allowed).
123	Field/Manholes	X	Watertight covers with stainless steel vents provided in 100-year floodplain. Vent has stainless steel screen.
124	Field/Manholes		Conseal CS-212 Polyolefin exterior joint wrap used on all joints, including grade rings.
125	Field/Manholes		Cored holes are neatly made by machine and have a rubber boot with no evidence of a loose band or leakage/infiltration. Cored holes are not too close together to multiple pipe entries or to the bottom of the manhole. A concrete bench and flow line provide a smooth transition into the existing manhole.
126	Field/Manholes		Inside drop manholes have tee and drop to bottom of manhole for a smooth transition of flow. Pipe is strapped to manhole wall if a long length. These manholes are five feet in diameter.
127	Field/Manholes		Outside drop manholes have pipe protrusion into manhole before drop and this is cut smooth to manhole inside wall.
128	Field/Manholes		Inverts are coming into the bottom of the manhole.
129	Sewer Services		Each unit/parcel has a sewer service. Services are not crossing other parcels as can be reasonably observed.
130	Sewer Services		Schedule 40 or DIP present as can be reasonably observed.
131	Sewer Services	X	Cleanout located at property line/road ROW or edge of easement, not buried, plumb, level, to grade.
132	Sewer Services	X	Cleanouts have proper cap, not cracked or broken or missing.
133	Sewer Services	X	Cleanouts in non-paved areas have a concrete ring. No settling or ponding of water around cleanout.
134	Pumping Stations and Force Mains and atypical distribution or collection system features		To be reviewed under individual situations and not included in this checklist.

Pre-acceptance performed over these dates: _____ Staff involved: _____

Signed by: Date:

Pre-acceptance punch list items checked and accepted on this date _____ by TOH Staff _____

System accepted by BOC and start of warranty on this date: _____.

Warranty check performed over these dates: _____ Staff involved: _____

Signed by Date:

Warranty punch list items checked and accepted on this date _____ by TOH Staff _____

Warranty security released on this date: _____ by TOH Staff _____