

Construction Inspection Checklist for Spring Box

Network/Project Name: _____	Date of inspection: _____
Contractor Name: _____	Zone: _____
ARIA: _____	Woreda: _____
Gov't Focal Name: _____	Kebele: _____
Spring Name: _____	

Construction supervision checklist for the Spring Box						
Stage 1: Excavation						
S/n	Checking item	Site level check (✓)			Comments	
		C	NC	NA		
1	Clearing and Excavation					
1.1	Confirm there is no latrine or pollutant agent upstream of the spring					
1.2	The surrounding area of the spring be cleared and there is good working environment					
1.3	Trees like euliptus which found within 50m up stream of the spring should be cut and removed					
1.4	The excavation starts from bottom and goes up until getting impervious layer. Excavation of spring area continues until get defined spring eye and hard strata below the spring eye					
1.5	The excavation assures at least 2m depth of natural ground above the higher spring eye					
1.6	The spring water is not ponded in the construction area. Is it collected with pipe and divert away from the construction area?					
1.7	Completion of excavation validated					
2	Design measurments					
2.1	Each measurments are taken together with the design team as per the design measurment procedures					
2.2	Is working drawing prepared? And the working drawing dimensions are as per the measurments taken above. BOQ prepared					
2.3	Working drawing aproved,and validated					

Note that to start construction of spring box, the above two mandatory validations should be satisfied . (2 mandatory validation)

General/overall comments to proceed to the next work: _____

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For the ARIA: -

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For the Gov't

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Construction supervision checklist for the construction of Spring Box							
Stage 2: Spring Box bottom slab							
S/n	Checking item	Site level check (✓)			Comments		
		C	NC	NA			
1	Preparation for cutting foundation:						
	The cutting foundation depth is at least 50 cm below the lowest spring eye, its thickness is 25 cm as per the BOQ and the foundation top level is 10cm below the washout level						
1.1							
1.2	Ensure 8mm rebar mesh with 20cmX20cm spacing, and properly tied						
1.3	Formwork installed and be concrete tight and firm strong						
1.4	Validate rebar arrangements and formworks for casting of concrete for the cutwall foundation						
1.5	Ensure measuring apparatus is available, check concrete mix ratio is 1:2:3 and mixed homogeneously and having uniform mix and colour, concrete mixed in clear platform						
2	Preparation for casting of spring box (bottom slab)						
2.1	Outlet, overflow/washout and air vent pipes and fittings are properly installed in its orientation, anchored well as per the specification and drawings. The washout level is atleast 12 cm below the inlet level						
2.2	Diameter, location, spacing, required length, required number, shape, bending dimension, and tying of the reinforcements are based on the specification						
2.3	Concrete spacer or uniform size crushed stone used for rebars to have adequate concrete cover						
2.4	Both ends of all flow control pipes shall be protected from entrance of any materials						
2.5	Outside formwork for the bottom slab is well installed, oiled and it is concrete tight						
2.6	Slab preparation approved, contractor can cast slab						
3	Preparation for casting of 30 cm high concrete						
3.1	The slab has been properly cured : it is not too white, no sandy when scratching with nails and has no hair crack						
3.2	Place the inside mold. The mold could be polished with cooking oil						
3.3	Verify many short PVC pipes (75 mm) are placed 12 cm above washout (slab) level with a slope (≥2%) toward the box to let the water enter the inside box. The pipes are pushed against the inside mold						
3.4	verify 30 cm high vertical stone is used as external formwork						
3.5	Approving the stone formwork and short pipe installation, the contractor can cast concrete between the mold and stone formwork						

Note that the contractor is not allowed to cast concrete for the bottom slab of the spring box before getting confirmation from the ARIA and/or Gov't construction supervision expert. (3 mandatory validation)

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Construction supervision checklist for the construction of Spring box					
Stage 3: Spring Box Wall					
S/n	Checking item	Site level check (✓)			Comments
		C	NC	NA	
1	Preparation at the site for concreting:				
1.1	Dig a V groove near the reinforcement to have good connection between the first concrete layer and the wall and free from debris and dust				
1.2	Check that the inside mold is free of dust and debris and oiled with cooking oil and installed as per the sequence of each molds				
1.3	Diameter, location, spacing, required length, required number, shape, overlapping dimension and tying of the reinforcements are based on the specification				
1.4	The ring bars ends overlap has to be staggered (not vertically aligned)				
1.5	Place banana false trunk(15cm long and 8cm diam) as steps with 30 cm vertical spacing and 40cm horizontally apart. The trunk must be pushed tight against inside mold and attached with bending wire				
1.6	Ensure that the quantity of Sand, Gravel and cement is largely sufficient to cast the entire wall.				
1.7	Check that the gravel size and quality fit the specification				
1.8	Check the outside formwork oiled with burnt oil and it is concrete tight. Set up of second row formwork continues after the first row concrete casted				
1.9	Wall preparation approved before 9am, contractor can cast wall in the presence of the supervisor				
2	Mixing of Concrete:				
2.1	Mixing shall be done in platform clear surface				
2.2	Measured quantity of materials as per proportion of the spec (1:2:3) do not mix more than one bag of cement per batch				
2.3	The ingredients are properly mixed and have uniform mix & color				
3	Placing and compaction of concrete:				
3.1	Fresh concrete should be placed before concrete gets hard no more than 15 minutes after mixing (casting of concrete should not be interrupted)				
3.2	Workability of concrete for ensuring proper handling and placing of concrete without segregation (Make a slump test = xx cm)				
3.3	Concrete is laid from one end, then continuously proceeded to the other end (one bucket per one bucket rotating)				
3.4	Compaction is done just upon pouring the fresh concrete with a steel GI pipe in the concrete and a wooden hammer on both side of the reservoir				
3.5	The entire wall concrete must be casted in one day without interruption				
3.6	Concrete wall casting is validated				
4	After concreting work				
4.1	Instruct the WA to watered the spring box twice a day atleast for seven days				
4.2	The wall has been properly cured : it is not too white, no sandy when scratching with nails and has no hair crack				

Note that the contractor is not allowed to cast concrete for the wall of the spring box before getting confirmation from the ARIA and/or Gov't construction supervision expert. At least one of the experts shall be present for the whole day at the site during casting of wall concrete. (2 mandatory validation)

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Construction supervision checklist for the construction of cut foundation wall and cover slab					
Stage 4: Spring Box cut foundation wall and cover slab					
S/n	Checking item	Site level check (✓)			Comments
		C	NC	NA	
1	Preparation for cutting foundation:				
1.1	Remove the stone formwork to have good connection between the bottom cutoff wall and the spring box to cast the top cutoff wall				
1.2	Verify the cutting foundation depth above the slab towards box is 32cm and towards the eyes is 20 cm above the higher spring eye level				
1.3	Formwork installed and be concrete tight and firm strong				
1.4	Validate preparation for casting of concrete for the top cutwall and contractor can cast				
2	Preparation for cover slab				
2.1	Fill the area upstream of the cutwall with rounded river stone and a layer of gravel on the top of the stone				
2.2	Verify the arrangment of rebars over the gravel with with 8mm mesh reinforcement @20cm spacing				
2.3	Install the outside formwork for the cover concrete, concrete tight and firm strong				
2.4	Validate preparation for casting of concrete cover and contractor can cast				
3	After concreteing				
3.1	Instruct the WA to watered the cut foundation and the cover slab twice a day atleast for seven days				
3.2	The cover slab has been properly curred : it is not too white, no sandy when scratching with nails and has no hair crack				

Note that the contractor is not allowed to cast concrete for the top cut foundation wall and cover slab before getting confirmation from the ARIA and/or Gov't construction supervision expert. (2 mandatory validation)

General/overall comments to proceed to the next work: _____

For the Contractor: - Name: _____ Signature: _____ Date: _____	For the ARIA: - Name: _____ Signature: _____ Date: _____	For the Gov't Name: _____ Signature: _____ Date: _____
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Construction supervision checklist for the construction of Spring Box					
Stage 5: Top slab					
S/n	Checking item	Site level check (✓)			Comments
		C	NC	NA	
1	Preparation at the site for concreting of top slab:				
1.1	Cleanliness of form work surface which will receive the concrete, leak tight and rigid				
1.2	Diameter, location, spacing, required length, required number, shape, bending dimension and tying of the reinforcements are based on the specification				
1.3	Concrete spacer or uniform dimension crushed stone used for rebars to have adequate concrete cover				
1.4	The dimension of manhole door and its opening as per the spec				
1.5	Top slab preparation is validated, contractor can cast the slab				
2	After concreteing work				
2.1	Instruct the WA to watered the spring box top slab twice a day atleast for seven days				
2.2	The slab has been properly cured : it is not too white, no sandy when scratching with nails and has no hair crack				

Note that the contractor is not allowed to cast concrete for the top slab of the reservoir before getting confirmation from the ARIA and/or Gov't construction supervision expert (**One mandatory validation**)

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Construction supervision checklist for the construction of Retaining Wall					
Stage 6: Retaining wall					
S/n	Checking item	Site level check (✓)			Comments
		C	NC	NA	
1	Back fill				
1.1	Back fill the whole excavation above the cover slab and down of the box with clayey soil. The backfill slope should not be more than 40%.				
1.2	If the slope of the back fill is too steep, use cut steps to reduce the slope and plant grass on contour lines for better protection				
2	Retaining wall				
2.1	The requirement of retaining wall (u/s & d/s) depends on the topography of the catchment in which the spring box located. The dimensions and types of retaining walls are fixed together with the design team and incorporated in the BOQ				
2.2	To reduce the back fill slope down stream of the catchment, use permeable retaining wall (dry stone, gabion)				
2.3	Verify the construction of the u/s and d/s retaining walls (types and dimensions) are as per the specification and BOQ				
2.4	Verify the span length of the retaining walls are greater than the span length of the cutting foundation wall				
2.5	when the retaining walls are water tight structures (masonry or concrete), verify many weep holes are available to drain water out of the retaining wall				
2.6	Provide a deep earthen canal above the spring catchment areas (catch drain)				
2.7	verify the close protection area is fenced				

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For the Gov't

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 Signature: _____
 Date: _____

Spring Box Completion Report & Proof of Achievement

Network: _____
Spring Name: _____

Date: _____
Contract ref no: _____

Part	To be checked	Controller 1 ARIA		Controller 2 WWO	
		Ok ✓	Not Ok X	Ok ✓	Not Ok X
Outside spring Box	No leakage around spring box				
	No cracks are observed on the outside part of the concrete box				
	The plastering of the outside part of the concrete box is smooth				
	The concrete box is hermetic to any external water infiltration				
	Top slab has slope to evacuate water				
	Outlets & overflow pipes well covered and protected				
	Verticality of structure maintain				
Manhole (door)	The door is surelevated from spring box top slab				
	There is a mortar joint inside of the door				
	The manhole door is easily opened and closed				
The inside part of the spring box	The surface floor is clean (absence of any sediment or rest of concrete)				
	The surface floor is smooth with no deterioration				
	No roots are observed inside the box				
	The height of the overflow pipe above the surface floor is less than 12 cm				
	The height of the outlet pipe above the surface floor is less than 5 cm				
	The section of the intake and overflow pipes correspond to the design				
	False banana trunk removed and it is corrected for nice step				
	The surface floor slope of the reservoir is towards the washout pipe				
	There is one air vent per outlet, 30 cm height				
Overflow outlet	The overflow outlet is well anchored and protected from further erosion				
	Water can flow out freely at outlet (pipe not submerged)				
	Overflow water is well drained after the overflow				
Around the spring	The spring box is not overtopped by surrounding soil				
	There are no trees growing just near to the spring box				
	A good protection canal diverts runoff water at upstream of the spring catchment				
	There are no sign of erosion that could affect the spring catchment				
	Gabions are straight, solid, and well sewed				
General overview	Masonry protection walls are solid with many weep holes to evacuate the water				
	The whole construction (including protection, crossings) looks nice, from inside and outside				
	High construction standard were respected during the whole construction (mix of cement and mortar, curing time, good connection of HDPE with PVC...)				
	All directions and designs given by the supervisor were immediately and well applied during construction.				
Total					

The 2 controllers agree that the contractor did not respect the minimum standard defined in the contract (10 X <i>maximum</i>). 5% will be withdrawn from the construction price and warning letter	☐ Yes	☐ No
The 2 controllers agree that the contractor did not respect the minimum standard defined in the contract (5 X <i>maximum</i>). 2% will be withdrawn from the construction price.	☐ Yes	☐ No
The 2 controllers agree that the contractor did not respect the minimum standard defined in the contract (3 X <i>maximum</i>). 1% will be withdrawn from the construction price.	☐ Yes	☐ No

The signatories of the present document certify that the above mentioned construction was achieved at the date of signature.

	Controller 1 (WWO Constrction expert)	Controller 2 (WWO Scheme Administraion expert)
Name		
Signature		
	WWO HEAD /Representative	Technical Assistant (ARIA)
Name		
Signature		