



## Wastewater Treatment Plant Aquifer Protection Permit Engineering Substantive Checklist

<b>Permittee:</b>		<b>Inventory No.:</b>	
<b>Reviewer:</b>		<b>LTF:</b>	
<b>Today's Date</b>		<b>Checked By</b>	

### Checklist Instructions

This checklist is provided as a guideline for ADEQ staff in performing technical substantive reviews and to the applicant on what information ADEQ will need to review Aquifer Protection Permit applications. This checklist is designed to be easy to read and follow. It is intended to address the majority of applications submitted to ADEQ, but not every possible variation or situation. Please visit [www.azdeq.gov](http://www.azdeq.gov) to find program specific information including applications, rules, statutes, BADCT manuals, and other guidance information. This checklist does not supplant or supersede statutory or rule requirements and is not intended to be binding on the applicant or ADEQ staff.

If you have any questions or need assistance, please call ADEQ Groundwater Protection staff at 602 771-4999.

### List of Documents Reviewed

List of documents reviewed:

### Amendment Description

Amendment Description (e.g. new/modified discharging facilities, new/modified permit conditions):



# Wastewater Treatment Plant Aquifer Protection Permit Engineering Substantive Checklist

Technical Requirements ( Wastewater Treatment Plan APP New and Significant amendments)	
Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	A202(A)(1) - Topographic map or other appropriate map of the facility location and contiguous land area, showing the following: <ul style="list-style-type: none"> <li>• Known use of adjacent properties;</li> <li>• all known water well locations found within one-half mile of the facility;</li> <li>• a description of well construction details and well uses, if available</li> </ul>
comment	
	A202(A)(2) - A facility site plan showing all property lines, structures, water wells, injection wells, dry wells and their uses, topography and the location of points of discharge (lat./long), all known borings (for numerous borings, a narrative description of the number and location of the borings is acceptable)
comment	
	A202(A)(3) - The facility design plans including proposed or as-built design details and proposed or as-built configuration of basins, ponds, waste storage areas, drainage diversion features, or other engineered elements of the facility affecting discharge.
comment	
	A202(A)(4)(a) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the chemical, biological, and physical characteristics of the discharge;
comment	
	A202(A)(4)(b) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the rate, volume, and frequency of the discharge for each facility;
comment	
	A202(A)(4)(c) - A summary of the known past discharge activities and the proposed facility discharge activities indicating the location of the discharge and a map outlining the pollutant management area described in A.R.S. §49-244(1)
comment	
	A202(A)(7) - Contingency Plan meeting requirements of R18-9-A204(A)1 thru 5 and -A204(D)1 thru 5. Note: Some of this information may have been covered in the BADCT section.
comment	
	A202(A)(8)(b) - Identify any potential foundation soil properties which could cause unstable conditions. For example: fissures, subsidence, collapsible soils, and excessive slopes. Is the location in a seismic impact zone where ground acceleration could cause damage to structures?
comment	
	A202(A)(9) - Detailed proposal indicating alert levels, discharge limitations, aquifer quality limits, monitoring requirements (discharge, groundwater and operational monitoring), and compliance schedule items. Examples: leak collection removal system (LCRS), freeboard, effluent quality, inspection of liners/structures, etc.
comment	
	A202(A)(11) - Any other relevant information required to evaluate the design of each discharging facility.
comment	



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### Technical Capability ( Wastewater Treatment Plant APP New and Significant amendments)

Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
A202(B) - Demonstrate the ability to maintain technical capability to carry out the terms of the APP. The following information shall be submitted for each person principally responsible for designing, constructing or operating the facility:	
	A202(B)(1) - Relevant licenses or certifications <ul style="list-style-type: none"> <li>Engineer (BTR for status <a href="http://www.btr.state.az.us">http://www.btr.state.az.us</a>)</li> <li>Construction Contractor (Registrar of Contractors website <a href="https://roc.az.gov/contractor-search">https://roc.az.gov/contractor-search</a>)</li> </ul>
comment	
	Professional training relevant to design, construct, or operate facility
comment	
	Work experience relevant to the design construction, or operation of the facility
comment	



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<b>Closure, Post-closure, and Financial Demonstration Requirements (Wastewater Treatment Plant APP New and Significant amendments)</b>	
Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	A202(A)(10) - Closure & Post-Closure Plan or Strategy. If this application is specifically for Closure, use the A.A.C. R18-9-A209 rule as a checklist. Closure and post-closure strategy should have enough detail for each discharging facility to justify cost estimates.
comment	
	A201(B)(5) - Cost Estimates were supplied for each discharging facility with sufficient detail to determine whether the estimate is reasonable. Detail includes a spreadsheet or table format showing unit costs (i.e. not lump sums) for: materials, equipment, QA/QC testing, analytical testing, labor, engineering, etc. See cost estimate checklist for WWTPs at <a href="http://www.azdeq.gov/node/542">http://www.azdeq.gov/node/542</a>
comment	
	A201(B)(5)(a) - Cost of closure- derived by an engineer, controller, accountant, etc. Cost estimates derived by an engineer should be sealed by an Arizona licensed engineer. Applicant to identify who prepared the cost estimate and how they were prepared, i.e. based on bids, cost-estimating tools etc.
comment	
	A201(B)(5)(b)(i) - Closure Costs consistent with closure plan or strategy.
comment	
	A201(B)(5)(b)(ii) - Post-Closure Costs consistent with post-closure plan or strategy
comment	
	A201(B)(5)(b)(iii) - For a sewage treatment facility or utility subject to Title 40 of the Arizona Revised Statutes, the operation and maintenance costs of those elements of the facility used to make the demonstration under A.R.S. 49-243(B)
comment	



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### BADCT Review and Facility List (Wastewater Treatment Plant APP New and Significant amendments)

Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply

List each facility in the table below and indicate whether it is "new" or "existing" (A.R.S. 49-201). If this is an amendment, only list the facilities for which the permit is being amended.

For wastewater treatment plants, indicate whether the applicant wishes to demonstrate presumptive BADCT (R18-9-B204(B)) or an alternative BADCT (R18-9-B204(D)).

Use the BADCT review attachments to this checklist to review the BADCT for each of the facilities listed below.

- Wastewater treatment plants use Attachment A: Wastewater Treatment Plant BADCT Review.

Facility Name	New or Existing	Presumptive or Alternative BADCT Proposed

Yes/No/NA	
	A202(A)(5)(a) - A description of the BADCT employed by the facility including a statement of the technology, processes operating methods, or other alternatives proposed to meet the requirements of A.R.S. 49-243(B), (G), or (P), as applicable. The statement shall describe: <ul style="list-style-type: none"> <li>(i) The alternative discharge control measures considered,</li> <li>(ii) The technical and economic advantages and disadvantages of each alternative, and</li> <li>(iii) The justification for selection or rejection of each alternative.</li> </ul> NOTE: If the facility meets presumptive BADCT (WWTP), there is no need to evaluate alternative designs and no need to complete AAC R18-9-A202.A.5.a(i)-(iii), b, c, and d.
comment	



## Wastewater Treatment Plant Aquifer Protection Permit Engineering Substantive Checklist

### Attachment A: Wastewater Treatment Plant BADCT Review

Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
<p>The requirements cited in the following rules (A.A.C. R18-9-B201 through B206) are applicable to all sewage treatment facilities that treat wastewater containing sewage, unless the discharge is authorized by a general permit under Article 3 (A.A.C. R18-9-A301 et. seq.).</p>	
	B201(C) - Operator is certified for the grade of the WWTP (see R18-5-114)
comment	
	B201(D) - O&M plan/outline submitted (Example: Bulletin 11, Chapter XI)
comment	
	B201(E) - Connections between the WWTP and a potable water supply will not cause contamination of a potable or public water supply. For example: backflow prevention.
comment	
	B201(F) - Untreated sewage from the WWTP CANNOT bypass the treatment system. Check for bypass pipes on plans/flow diagram.
comment	
	B201(G) - Reclaimed water is regulated under a valid Reuse permit (18 AAC 11, Article 3). (Indicate where reclaimed water is dispensed. Indicate any direct reuse sites. Indicate whether there is an NOI on file)
comment	
	B201(H) - Biosolids regulation – Prep, transport, land application of biosolids is regulated under 18 AAC 9, Art 10 (Indicate the ultimate disposition of biosolids) These regulations apply to land application, transport or disposal in a "sewage sludge unit" defined as "land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated".
comment	
	B201(I) - Setbacks are established (Indicate what setbacks are used, Include setbacks included in design plans on a map)
comment	
	B201(I)(1)(a) - Noise levels do not exceed 50 decibels or alternative level in a local ordinance
comment	
	B201(I)(1)(a) – (d) - "Full" – all components are fully enclosed, odor scrubbers are installed on all vents, fencing is aesthetic. Required for each unit containing sludge. List WWTP units and materials of construction of covers for noise and odor control for each unit.
comment	
	B201(I)(2) - Waivers were used to decrease setbacks by either a local ordinance or waiver signed by affected property owners
comment	
	B202(A) - All applicants shall submit a design report <b>sealed</b> by an Arizona-registered professional engineer. Can review design reports that have words 'DRAFT' or 'CONCEPT'. However, at the end of the review, the FINAL Design Report must be submitted.
comment	



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## Attachment A: Wastewater Treatment Plant BADCT Review

Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<p>B202(A)(1) - The design report shall include wastewater characterization including</p> <ul style="list-style-type: none"> <li>- quantity (see also B202(A)(9)) (Refer Table 1 of APP Rule)</li> <li>- quality (BOD, TSS, TN, pH) Table 3-15 &amp; p. 666 Metcalf &amp; Eddy</li> <li>- seasonality (See also B202(A)(9)) (Not required for &gt;1MGD WWTP)</li> <li>- impact of increased flows as the facility reaches design flow</li> </ul> <p>Is there a possibility of the presence of industrial, hazardous, or mining wastewater, or pesticides, PCBs, or radionuclides in the wastewater that will be treated at the WWTP?</p>
comment	
	<p>B202(A)(2) - The proposed method of disposal, including solids management; Description of effluent disposal. Options include recharge (percolation, direct injection), evaporation, reuse (on-site or off-site), AZPDES. For design drawings and calculations, see -B202(3) below: Recharge Basins, Leach Fields, Land Application of Effluent, Effluent Pump Station, Evaporation Pond Description of sludge treatment &amp; method of disposal of sludge/biosolids. For design drawings and calculations, see -B202(3) below: Sludge Drying Beds and Land Application/Composting</p>
comment	
	<p>B202(A)(4) - A description of planned normal operation. Flow Line Diagram should include: The WWTP Name &amp; The WWTP design flow capacity All the treatment trains All the treatment units in all the treatment trains including the flow splitter box All the effluent holding ponds &amp; emergency ponds All lift stations and effluent pump stations, All the pumps For Expanded WWTP: Existing units in regular lines &amp; proposed units in bold lines All sludge flow lines shown: RAS, WAS Filter or Membrane Bioreactor Backwash Influent &amp; Effluent Holding Tanks Filter or Membrane Bioreactor Backwash line going to headworks or anoxic or aeration basin Effluent Line going to a labeled discharge</p>
comment	



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Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<p>B202(A)(5) - A description of operation and maintenance activities and a description of contingency and emergency operation of the system; (Outline in Bull 11.)</p> <p>Examples: UV system failure - disinfect by chlorination, filter failure - stand-by chemical addition</p> <p>For WWTP greater than 250,000 gpd, with recharge as the only method of disposal, ask for their contingency plan in times of non-compliance with the discharge limitations (e.g. emergency storage pond or alternate disposal). Smaller plants could vault and haul.</p> <p>Identify potential emergencies and responses.</p> <p>Indicate whether the WWTP is completely automated.</p> <p>A list of emergency contacts, their titles, and their telephone numbers that includes the following:</p> <ul style="list-style-type: none"> <li>Ambulance-Fire-Police: 911</li> <li>Arizona Department of Emergency Management: (602) 244-0504 or (800) 411-2336 WWTP Operator</li> <li>WWTP Owner</li> <li>Waste Hauler Pump Truck Companies</li> <li>Automation Repairmen</li> <li>Electricians</li> <li>Plumbers</li> <li>Pump Repairmen</li> <li>ADEQ Compliance: Central/Phoenix Office: (602) 771-4841, or ADEQ Southern Regional/Tucson Office: (520) 628-6733</li> <li>WWTP Consulting Engineer</li> <li>WWTP Designer</li> <li>County Health Department</li> <li>APS/Electric Utility</li> </ul>
comment	
	<p>B202(A)(6) - A description of construction management controls. Example is leakage testing after tank/basin installation. This could be located on plans or in specifications.</p> <p>QA/QC for liner installation</p> <p>Copy of manufacturer's specifications on type of material, and thickness</p> <p>Copy of manufacturer's installation procedure and QA/QC during construction</p> <p>Copy of manufacturer's leakage testing procedure after liner installation</p>
comment	
	<p>B202(A)(7) - A description of the system startup plan, including pre-operational testing, expected treated wastewater characteristics and monitoring requirements during startup, expected time-frame for meeting performance requirements specified in R18-9-B204 and any other special startup condition that may merit consideration in the individual permit. In case of pond liners, submit liner installer's leakage testing procedure.</p> <p>For New Subdivisions: If initial flows are low, indicate how the plant meet the design effluent quality. For example: haul offsite, batch treatment, recycle flows, and operate like a SBR.</p>
comment	





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Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<p>B202(A)(8) - A site diagram depicting compliance with the setback requirements established in R18-9-B201(I);</p> <p>Odor control over odor producing units – cover, scrubbers, etc., shown on drawings _____</p> <p>Noise control enclosure at pumps and air blowers, shown on section drawing no._____. Below 50 decibels?</p> <p>Is the fence aesthetic, yes or no?</p>
comment	
	<p>B202(A)(9) - Flows for</p> <p>a) total design flow:</p> <p>b) max day:</p> <p>c) max month:</p> <p>d) peak hr:</p> <p>e) min day:</p> <p>f) min month:</p> <p>g) min hr:</p> <p>Flow for non-municipal WWTP is based on population to be served (approximately 100 gpd/person, 2.34 persons/dwelling). Lower flows based on low flow fixtures.</p> <p>Flow calculations account for filter backwash flow, and Inflow or Infiltration (for existing facilities).</p> <p>Typical Peak Factors for flows &lt; 5.0 MGD are: 2 for max. daily flow, and 3 for peak hourly flow (Bulletin 11)</p> <p>For larger flows see M&amp;E Figure 3-13, page 202</p>
comment	
	<p>B202(A)(10) - Certification by an AZ registered PE that all other aspects of the design (and construction), including pipe coding, auxiliary power sources, and separation requirements comply with applicable statutes, rules, and codes.</p>
comment	



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	<p>B203(A) - For flows &lt; 1 MGD, plans and specs are required to be submitted. The Director may waive this if the same Owner/Operator was permitted for a WWTP that is &gt;1MGD (For &lt; 250,000 gpd WWTP, specs can be in the drawings or as Manufacturer's cut-sheets.)</p> <p><b>PLANS</b> For EACH sheet and EACH treatment unit subject to design review (listed in -B202(A)(3)): Sealed by AZ registered P.E., Not stamped "Preliminary - Not for Construction", dimensions of units match calculations, piping diagram matches flow line diagram, materials of construction consistent with specs., sludge flow lines shown (RAS and WAS), aerators shown. Drawing sheet for 'Notes' that includes the water-sewer separations, blue-stake requirements, duties of the contractor, the engineer, etc. Footnote for leakage testing of all WWTP tanks after installation. They also have the option of mentioning leakage testing in the Specifications document or the Design Report.</p> <p>Unit Specific:</p> <ul style="list-style-type: none"> <li>• Influent Lift Station: water levels, alarm system, odor/noise control, 2 pumps each w/check valve, pump capacity per design</li> <li>• Primary Clarifier: depth 10' (10 SS), scum removal</li> <li>• Secondary Clarifier: depth 10-12' (10 SS), scum removal</li> <li>• Aeration basins: aerators</li> <li>• Anoxic basins: no aerators</li> <li>• Filters: media, backwash influent/effluent holding tanks</li> <li>• Cathodic Protection provided for metal tanks.</li> <li>• Recharge Basins: effluent distribution structure, percolation rate</li> <li>• Leach Field: leach lines, percolation rate, frost depth</li> <li>• Wetlands: depth of water, depth of bed, signage warning type of water</li> <li>• Aerobic Digester: depth 18-20', supernatant draw-off line 2-6' below surface</li> <li>• Anaerobic Digester: depth 20', gas space 2-3', water seal, pressure relief valve, vacuum relief valve, thermal valve, sludge inlet/draw-off pipe, supernatant draw-off pipe 2-6 feet below surface, sediment trap, drip trap, waste gas burner, gas meter, flame arresters (between vacuum and pressure relief valves, after sediment traps on gas line, at the gas burner and before every boiler), heating, sampling well (Thief Hole)</li> <li>• Drainage Features: berms/drainage ditches/culverts, run-on/runoff flow lines</li> <li>• Liners: bedding, anchor detail, cover, pipe boot</li> <li>• Effluent Pump Station: water levels, alarm system, noise control, 2 pumps each w/check valve, pump capacity per max. daily flow</li> </ul> <p><b>SPECIFICATIONS</b> For ALL units subject to design review (listed in -B202 (A) (3)): units match design parameters (e.g. flow capacity), construction QA/QC and leak testing after installation, construction materials/thickness, installation procedures. Separate specifications are not required if all the required information is in the plans/drawings.</p>
comment	



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**Attachment A: Wastewater Treatment Plant BADCT Review**

Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<p>B203(B) - For flows &gt; 1 MGD, plans and specs may be required to be submitted if the Department finds any of several situations: inadequate design report (treatment, 100 or 25-year flood protection, standby power source), innovative technology, can't meet performance requirements, inconsistent sizing/compatibility, inexperienced designer (&lt;3 plants of similar size), designer of plant with enforcement actions, designer in violation of BTR registration, expansion without upgrades, constructed facility does not conform to design report.</p> <p><b>PLANS</b>            For EACH sheet and EACH treatment unit subject to design review (listed in -B202(A)(3)): Sealed by AZ registered P.E., Not stamped "Preliminary – Not for Construction", dimensions of units match calculations, piping diagram matches flow line diagram, materials of construction consistent with specs., sludge flow lines shown (RAS and WAS), aerators shown. Drawing sheet for 'Notes' that includes the water-sewer separations, blue-stake requirements, duties of the contractor, the engineer, etc. Footnote for leakage testing of all WWTP tanks after installation. They also have the option of mentioning leakage testing in the Specifications document or the Design Report.</p> <p>Unit Specific:</p> <ul style="list-style-type: none"> <li>• Influent Lift Station: water levels, alarm system, odor/noise control, 2 pumps each w/check valve, pump capacity per design</li> <li>• Primary Clarifier: depth 10' (10 SS), scum removal</li> <li>• Secondary Clarifier: depth 10-12' (10 SS), scum removal</li> <li>• Aeration basins: aerators</li> <li>• Anoxic basins: no aerators</li> <li>• Filters: media, backwash influent/effluent holding tanks</li> <li>• Cathodic Protection provided for metal tanks.</li> <li>• Recharge Basins: effluent distribution structure, percolation rate</li> <li>• Leach Field: leach lines, percolation rate, frost depth</li> <li>• Wetlands: depth of water, depth of bed, signage warning type of water</li> <li>• Aerobic Digester: depth 18-20', supernatant draw-off line 2-6' below surface</li> <li>• Anaerobic Digester: depth 20', gas space 2-3', water seal, pressure relief valve, vacuum relief valve, thermal valve, sludge inlet/draw-off pipe, supernatant draw-off pipe 2-6 feet below surface, sediment trap, drip trap, waste gas burner, gas meter, flame arresters (between vacuum and pressure relief valves, after sediment traps on gas line, at the gas burner and before every boiler), heating, sampling well (Thief Hole)</li> <li>• Drainage Features: berms/drainage ditches/culverts, run-on/runoff flow lines</li> <li>• Liners: bedding, anchor detail, cover, pipe boot</li> <li>• Effluent Pump Station: water levels, alarm system, noise control, 2 pumps each w/check valve, pump capacity per max. daily flow</li> </ul> <p><b>SPECIFICATIONS</b>            For ALL units subject to design review (listed in -B202 (A) (3)): units match design parameters (e.g. flow capacity), construction QA/QC and leak testing after installation, construction materials/thickness, installation procedures. Separate specifications are not required if all the required information is in the plans/drawings.</p>
comment	



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<b>Attachment A: Wastewater Treatment Plant BADCT Review</b>	
Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<p><b>R18-9-B202(A)(3)</b> - A description of the treatment unit processes and containment structures, including diagrams and calculations that demonstrate that the design meets BADCT requirements and will achieve treatment levels specified in R18-9-B204 through R18-9-B206, as applicable, for all flow conditions indicated in subsection (A)(9). If soil aquifer treatment or other aspects of site conditions are used to meet BADCT requirements, the applicant shall document performance of the site in the design report or the hydrogeologic report;</p>
	<p><b>DESIGN CALCULATIONS FOR EACH UNIT</b>            Example references: ADEQ Bulletin 11, Metcalf &amp; Eddy, EPA Publications</p> <ul style="list-style-type: none"> <li>- List of design parameters should be adequate including flow conditions under (A)(9).</li> <li>- For each treatment unit included in the design, provide calculations/computer model used for design</li> <li>- May include detailed calculation procedure and references from which the design equations were used.</li> </ul>
comment	
	<p><b>LIFT STATION</b>            Application should indicate that the lift station is designed for the WWTP peak hourly flow capacity or an equalization basin provided.            If the lift station is part of the collection system, it should have a General Permit (not part of this review checklist)            If lift station is part of the WWTP, it requires review for setback, odor control, and design review.</p>
comment	
	<p><b>EQUALIZATION BASIN:</b>            Application should indicate the equalization basin sizing is based on peak flow with the peak flow number mentioned. Provide design calculations based on hourly flow values on a peak or maximum day flow.</p>
comment	
	<p><b>HEADWORKS:</b>            Application should provide the design of headworks. If headworks are not included, are there influent grinder pumps or grit chambers?            Indicate whether the headworks are covered for odor control.</p>
comment	
	<p><b>PRIMARY CLARIFIERS:</b>            Capacity based on peak hourly flow if there is no EQ basin            Example reference: Bulletin 11, pg VII-22, Table VII-2            Review the following: surface loading rate, weir loading rate and retention Time</p>
comment	
	<p><b>AERATION BASIN WITH ANOXIC BASIN</b>            Example reference: Bull 11 pp. 39-46, Table VII-5 (p.40)            Review the following: volume of reactor (BOD, TN removal), peak flow handling capacity in case there is no EQ basin, hydraulic retention time or Theta in each unit, amount of air required, air delivery rate, type of dispersal, manufacturer's cut-sheets for diffuser specifications that state the oxygen transfer efficiency, sludge retention time (SRT) or sludge age or Theta C, de-nitrification calculations, amount of sludge produced, sludge recycle rate, method used to maintain low DO in the anoxic tank, MLSS or MLVSS, F/M Ratio, volume of anoxic chamber.</p>
comment	
	<p><b>MEMBRANE BIOREACTORS</b> (Ref: 4th Edition Metcalf &amp; Eddy)            Review the following: design for maximum daily flow, detention time, SRT, flux, de-nitrification calculations.</p>
comment	



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	<p><b>WETLANDS:</b>            Example reference: Type 3.05/3.07 General Permit.            Review the following: water depth, rainfall containment, freeboard, liner and protective cover design.</p>
comment	
	<p><b>STABILIZATION LAGOONS:</b>            For existing lagoons, are applying any herbicides &amp;/or pesticides as part of O&amp;M?</p>
comment	
	<p><b>KRAUS TREATMENT:</b></p>
comment	
	<p><b>SECONDARY CLARIFIERS:</b>            Example reference: Bulletin 11, pg VII-22, Table VII-2            Review the following: capacity (peak flow if not EQ basin), detention time for average and peak flow, surface loading rate, weir loading rate, retention time.</p>
comment	
	<p><b>FILTERS</b>            Review the following: prior to UV disinfection, capacity (hydraulic capacity X sludge recycle rate, if applicable), loading rate, media, cloth media disc/fabric filter, backwash calculations or discussion, designed for maximum daily flow (or peak flow in case there is no EQ basin). Filtration following SBRs is 1) sized for 4 to 5 times the WWTP design flow , and 2) designed based on the Decant Rate and # of SBRs discharging at a time.</p>
comment	
	<p><b>DISINFECTION UNITS</b>            Review the following: peak flow handling capacity in case there is no EQ basin.            Disinfection following SBR is sized for 4 to 5 times the WWTP design flows.</p>
comment	
	<p><b>ULTRAVIOLET (UV):</b>            Rules of Thumb:            Check and see if filtration has been provided before UV.            Contact time: a few seconds            Dosage: (65% transmittance) 30,000 uWs/cm<sup>2</sup> for up to 45 CFU, 100,000 uWs/cm<sup>2</sup> for Non-Detect following media filtration, 80,000 uWs/cm<sup>2</sup> following membrane filtration            Ref: UV Disinfection Guidelines for Drinking Water and Water Reuse by National Water Research Institute, Dec. 1999</p>
comment	
	<p><b>CHLORINATION:</b> Reference Bulletin 11            Rules of Thumb:            Contact time: 15 min            Dosage: 8 mg/l Chlorine            Note: Nitrification / De-nitrification are the common cause of poor coliform reduction. Can add 1 mg/l ammonia prior to chlorination to form chloramines to improve disinfection.</p>
comment	



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	<b>DE-CHLORINATION:</b> Must meet BADCT requirements. Dosage M&E p 1263 Contact time is a few seconds
comment	
	<b>AEROBIC SLUDGE DIGESTER:</b> M&E p. 1536, Bulletin 11 p. VII-93 Rules of Thumb: Depth: 18 – 20 feet Detention Time: > 20 days Inlet sludge solids concentration: 1.5 – 4% DO maintained: 1 – 2 mg/l (40% Volatile Matter is digested in an Aerobic Digester.)
comment	
	<b>ANAEROBIC SLUDGE DIGESTER:</b> Review depth and sizing calculations. Rules of Thumb: Inlet sludge should have solids content less than 10%. Loading = 0.15 to 0.35 lb volatile solids / cu. ft digester volume Ideal Operation Temperature: 68 deg F (37 deg C) Detention Time: 25 – 30 days at a temperature range of 68 to 113 deg F (Mesophilic digestion) Detention Time: 50 – 180 days at a temperature of 50 – 68 deg F (Psychrophilic digestion) Detention Time: 5 – 12 days at a temperature greater than 113 deg F (Thermophilic digestion) Gas production: 12 – 18 cu. ft / lb volatile matter destroyed (Gas Heat V of 500 – 600 BTU/cu. ft) (50% Volatile Matter is digested in an Anaerobic Digester.)
comment	
	<b>BELT FILTER (or other SLUDGE DEWATERING UNIT)</b>
comment	
	<b>SLUDGE (RAS &amp; WAS) PUMPS</b>
comment	
	<b>SLUDGE DRYING BEDS:</b> Design plans and specifications for liners, QA/QC plan and report. Sizing based on sludge production calculations. Berms adequate for storm event.
comment	
	<b>SLUDGE LAND APPLICATION or COMPOSTING:</b> Refer to A.A.C. R18-9-1001 – 1015 Refer to 40 CFR Part 503 Refer to M&E Chapter 14, 4th Edition Provide for berms, surface water controls, flood zones, only WWTP solids
comment	



## Wastewater Treatment Plant Aquifer Protection Permit Engineering Substantive Checklist

### Attachment A: Wastewater Treatment Plant BADCT Review

Yes/No/NA	Y: yes, meets the requirement; N: no, does not meet the requirement (see comment below); NA: does not apply
	<b>EFLUENT FLOW METERING:</b> Method and location (latitude and longitude) of measuring flow. Continuous recording and totalizing for >100,000 gpd is common.
comment	
	<b>EFFLUENT SAMPLING POINT:</b> Description and location (latitude and longitude) of effluent sampling point.
comment	
	<b>RECHARGE BASINS:</b> Sizing is adequate (e.g. 2 feet of freeboard). Percolation tests, volume of basin. Hydrologist would make a determination of compliance with AWQS.
comment	
	<b>LEACH FIELDS/UNDERGROUND IRRIGATION:</b> Sizing is adequate. Percolation test, leach field design. Hydrologist would make a determination of compliance with AWQS.
comment	
	<b>REUSE OF EFFLUENT:</b> The permit will need to include the reuse classification for effluent and a reuse monitoring table.  <b>If reuse is the only method of disposal</b> , need to show that the flow will not exceed consumptive reuse (i.e. the reuse is not disposal per A.A.C. R18-9-A702(C)). The permit may need to limit the flow if the flow exceeds consumptive reuse. Alternatively, a storage or evaporation pond could be designed to store the excess reclaimed water until it could be reused. <u>Need a water balance to make determination.</u>  <b>If reuse is not the only method of disposal</b> , it is not necessary to show consumptive reuse of entire flow.  <b>Demonstrate</b> the requirement of A.A.C. R18-9-B701C(2)(d) which states that an APP must contain: <b>“Provision for cessation of delivery, if necessary, and storage or disposal if reclaimed water cannot be delivered for direct reuse.”</b> If reuse is the only method of disposal, we typically recommend 5 days worth of storage in case of cessation of delivery, if disposal by vault and haul is not practical. If there is another method of disposal in the permit that can handle the full flow if reclaimed water cannot be reused, this requirement is satisfied.  See also -B204(B)(4) for discussion on <b>Reuse Pathogen Reduction</b>  All ponds that are part of the Reuse System (off the WWTP site) are exempt from APP and therefore do not require review in the APP process A.R.S. 49-250.B.6.
comment	
	<b>EFFLUENT PUMP STATION:</b> Designed for maximum daily flow.
comment	
	<b>EFFLUENT EVAPORATION POND:</b> Sizing based on water-balance with MONTHLY flows, evaporation, and precipitation rates.  Freeboard Berm design/compaction/permeability Liner design/compaction/permeability depends on required containment based on effluent quality Cite reference of design
comment	



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	<p>EFFLUENT DISCHARGE TO AZPDES: Check pipe elevation at 100-year flood elevation</p>
comment	
	<p>EMERGENCY STORAGE PONDS: Needed if the receiving waters or aquifers serve as a source for a downstream domestic water supply. This is decided by the <u>HYDROLOGIST</u>.</p> <ul style="list-style-type: none"> <li>- <b>Ask</b> hydrologist if the Contingency Plan adequately addresses the above issue.</li> <li>- If yes, require construction of an emergency storage basin with minimum 5 day storage and lined with a 60 mil HDPE liner, OR,</li> <li>- Require maximum consecutive and total monthly time period that the operator decides to use the ponds</li> </ul> <p>Then, check for sizing of capacity in gallons, liner design, QA/QC</p>
comment	
	<p>NEW TECHNOLOGY If any new treatment technology has been used anywhere in the process, has the technology been approved by NSF? Ask for effluent quality results from an example project.</p>
comment	
	<p>BUOYANCY STABILITY: If shallow groundwater conditions, provide the weight of the WWTP units as sufficient or provide tie-downs. Indicate whether dewatering required for construction.</p>
comment	
	<p>DRAINAGE FEATURES (A.A.C. R18-9-B203(B)(4) Performance criteria are: 1) Protection from physical damage due to a 100-year flood and 2) Ability to continuously operate during a 25-year flood. FEMA/FIRM map for out of 100-year floodplain Grading and Drainage plan designed for 25 year flood</p>
comment	
	<p>DAM SAFETY (A.A.C. R12-15-1203) Indicate whether ponds could be considered jurisdictional dams per the criteria cited. If the height from the toe of the berm to the crest of the berm is greater than 6 feet AND the storage capacity is 50 acre-feet or more, applicant should check with the ADWR Dam Safety program for a determination.</p>
comment	
<b>End of B202(A)(3) components</b>	
	<p>B204(B)(1) - An owner or operator of a new sewage treatment facility shall ensure that the facility meets the following performance requirements upon release of the treated wastewater at the outfall: BOD<sub>5</sub> &lt; 30 mg/l (for 30 day average) BOD<sub>5</sub> &lt;45 mg/l (for 7 day average) TSS &lt; 30 mg/l (for 30 day average) TSS &lt;45 mg/l (for 7 day average) pH between 6.0 and 9.0 Removal efficiency of 85% for BOD<sub>5</sub> and TSS</p>
comment	





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	B204(B)(2) - Are waste stabilization ponds used? If so, not considered BADCT unless applicant demonstrates site-specific characteristics to justify use of ponds as method of secondary treatment
comment	
	B204(B)(3) - Total Nitrogen < 10 mg/l (5 month rolling geometric mean)
comment	
	B204(B)(4) - Pathogen removal: Specify preference in APP monitoring tables : Fecal Coliform or E. coli Determine whether enteric virus monitoring will be required for A+ Reclaimed water classification. If the applicant does not have chemical feed capability, enteric virus monitoring is required.
comment	
	B204(B)(4)(a) - Pathogen removal for flows < 250,000 gpd Fecal Coliform less than 200 CFU/100 ml (7 sample median) OR <i>E. coli</i> less than 126 CFU/100 ml (7 sample median) Fecal Coliform less than 800 CFU/100 ml (single sample max) OR <i>E. coli</i> less than 504 CFU/100 ml (single sample max) These limits apply if the depth to the groundwater table is > 20 feet and system is not located above fractured bedrock. Otherwise go to 4.b
comment	
	B204(B)(4)(b) - Pathogen removal for flows > 250,000 gpd Fecal Coliform less than 2.2 CFU/100 ml (7 sample median) OR <i>E. coli</i> less than 2.2 CFU/100 ml (7 sample median) Fecal Coliform less than 23 FU/100 ml (single sample max) OR <i>E. coli</i> less than 15 CFU/100 ml (single sample max)
comment	
	B204(B)(4)(c) - Specify unit treatment processes, such as chlorination-de-chlorination, ultraviolet, and ozone may be used to achieve the pathogen standard.
comment	
	B204(B)(4)(d) - If soil aquifer treatment for removal of fecal coliform is proposed for pathogen removal, must demonstrate that coliform concentrations in the effluent will meet the performance requirements of 4.a or b before reaching groundwater.
comment	
	B204(B)(5) - The performance standard for a constituent with a numeric AWQS is the AWQS. The APP will have metals and VOC monitoring. Indicate whether there is a possibility of presence of pesticides, PCBs, and radionuclide.
comment	



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	<p>B204(B)(6) - The performance requirement for a constituent regulated under A.R.S. 49-243(I) is removal to the greatest extent practical regardless of cost. These constituents include organic carcinogens and other organic substances and pollutants referenced in the statute. This requirement is met for WWTP by the meeting the criteria of 6.a. and 6.b.</p> <p>a. An operator shall minimize trihalomethane compounds generated as disinfection byproducts using chlorination, de-chlorination, ultraviolet, or ozone as the disinfection system or using a technology demonstrated to have equivalent or better performance for removing or preventing trihalomethane compounds.</p> <p>b. Methods used to achieve industrial pretreatment. This requirement may be met in the discharge monitoring that includes metals &amp; VOCs (option iii). It can also be met by the WWTP regulating industrial sources of influent.</p>
comment	
	<p>B204(B)(7) - "A maximum seepage rate less than 550 gallons per day per acre for all containment structures within the treatment works. A sewage treatment facility that consists solely of containment structures with no other form of discharge complies with this Part by operating below the maximum 550 gallon per day per acre seepage rate."</p> <p>Provide a statement from an Arizona P.E. that the maximum seepage rate is less than 550 gallons per day per acre for all containment structures within the treatment works.</p> <p>"Treatment works" - used for containing "sewage"</p> <p>"sewage" - untreated wastes</p> <p>Therefore, this requirement does not apply to effluent holding, sludge drying beds or effluent disposal.</p> <p>Drawings for the WWTP unit materials of construction or for a list of WWTP units with their material of construction and thickness.</p> <p><u>Accepted Materials:</u> Monolithic Steel, Precast Concrete, RCC, Synthetic Liner &gt; 40 mil  <u>Not Accepted:</u> Asphalt (rubberized or not), Gunitite or Shotcrete, Concrete Block, SS-13, Clay</p> <p>Include leakage testing of all new WWTP units OR mention about it in the Design Report OR stated in the Specifications</p> <p><b>EXISTING STRUCTURES:</b></p> <p>Provide a signed and sealed certification from a registered engineer stating that the existing unit is structurally sound and adequate to function as a wastewater treatment unit and that its bottom permeability is less than 550 gpd/acre.</p>
comment	
	<p>B204(D) - An applicant shall formally request in writing and justify an alternative that allows less stringent performance than that established in this Section, based on the criteria specified in A.R.S. 490243(B)(1).</p>
comment	
	<p>B205 - An owner or operator of a existing sewage treatment facility (A.R.S. 49-201(16)) shall conform with the following:</p>
comment	
	<p>B205(1) - Identify one or more design improvements that brings the facility closer or to within the treatment performance requirements specified in -B204 considering the factors listed in A.R.S. 49-243(B)(1)(a) and (B)(1)(c) through (h)</p>
comment	



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	B204(B)(2) - The designer can eliminate from consideration alternatives identified in 1. that are more expensive than the number of gallons of design flow time \$1.00 per gallon;
comment	
	B204(B)(3) - The designer shall select a design that incorporates one or more of the considered alternatives by giving preference to measures that will provide the greatest improvement toward meeting the treatment performance standards of B204.
comment	

### Reference list (with links if available)

List of documents review: <ul style="list-style-type: none"> <li><a href="#">Clean Closure Guidance Manual</a></li> <li>Blaney-Criddle (<a href="#">explanation</a> and <a href="#">spreadsheet</a>)</li> <li>Metcalf and eddy, 4<sup>th</sup> edition</li> <li><a href="#">Bulletin 11</a></li> </ul>
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### Statutes and Rules

Statutes: <ul style="list-style-type: none"> <li><a href="#">Point of Compliance</a></li> </ul> Rules: <ul style="list-style-type: none"> <li><a href="#">Aquifer Water Quality Standards</a></li> <li><a href="#">Aquifer Protection Permit rules (R18-9)</a></li> <li>Exemptions: <a href="#">24 types of facilities</a> and <a href="#">4 classes</a></li> </ul>
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