Residential Deep Green Building Checklist

[**DRAFT** v. 2.0] oasisdesign.net © April 2008…please send suggestions to oasis@oasisdesign.net

Site_____Date_____

The purpose of this list is to inspire and inform deep green home and garden projects, whether do-it-yourself, with Oasis Design, or others as consultants.

Along with drawings, it can serve to orient a building team to the culture and specifics of your project, so everyone is headed for the same goalpost.

The map is not the terrain. This list matters only to the extent it helps things get built well on the ground. If a question is difficult to answer, skip it for now. The list is general. It includes, for example, systems so radically simple they may be unfamiliar/inapplicable. Just cross off anything that doesn't apply to your project.

Reminder: **Clarity on goals and context will pay good dividends.** Ecological design, above all else, is context-specific. A change in one of any number of variables can change the whole design. Also, be realistic; it's better to aim low and hit the target.

For any Oasis design consultation, fill out *all* of **Goals** and **Context**, plus whatever the focus of the consult is. (our specialties are denoted by a "•").

More information on these points is on our website, oasisdesign.net, and in our books *Principles of Ecological Design*, *Water Storage*, and *The New Create an Oasis with Greywater*. Good luck!

—The Oasis Design Team

Synopsis

Short narrative description of your project's essence
(re-chedk this periodically) Example: "A cozy, soulful home for a single mom and two children, built in manageable stages, debt-free and with moderate stress, usable as soon as possible and throughout the stages. State of the art deep green, with lots of good design, few square feet low inherent resource use, some on-site food production. Adaptable for working at home, changing family configurations, later renting out, etc.."

Goals

General Goals/Project Culture/Assumptions

What are the guiding philosophies and aesthetic (E.g., fancy gated subdivision, shack in hippie commune)?
Check all that apply, or mark the point on the "Low" to "High" scale that is most appropriate, thusly: L . . . (.) . . H

Perfection standard L . . . . . H
Idiotfroof-ness L . . . . . H
Pampered-ness level L . . . . . H
User lifestyle adjustment L . . . . . H
System resiliency L . . . . . H
Self-reliance goals L . . . . . H
Liability paranoia L . . . . . H
Legal compliance L . . . . . H
Legal precedent, policy change L . . . . . H
Fire safety L . . . . . H
Earthquake L . . . . . H
Hygiene standard? L . . . . . H

To what degree do you want to/have to conserve…

Energy L . . . . . H ❑ Want to ❑ Have to
Water L . . . . . H ❑ Want to ❑ Have to
Materials L . . . . . H ❑ Want to ❑ Have to
Money L . . . . . H ❑ Want to ❑ Have to
Privacy L . . . . . H

Who is going to be living there and how could this change over time?

Economic Goals

Built debt-free L . . . . . H
Work at home L . . . . . H

Water System Goals

All potable? Y / N
Irrigation for (area, plants): _____
Fire suppression specs:

Reserve requirement L · · · · · H
Hydrant size L . . . . . H
Fire sprinklers L . . . . . H
Security L . . . . . H

House Goals

See design section

Energy Goals

Energy independence L . . . . . H
Passive solar heat L . . . . . H
Low transportation use L . . . . . H

Landscape Goals

❑ Outdoor living
❑ Beauty
❑ Food production
❑ Erosion control ❑ Slope stabilization
❑ Fire break
❑ Privacy screen
❑ Windbreak
❑ Micro climate modification *(e.g., windbreak, increased cooling via evapotranspiration, shade)*

Greywater System Goals

Note: For simple, easy greywater systems, performance is lower, but 90% of this list is not necessary. See Create an Oasis *for a list of simple systems.)*

❑ Irrigate/ Save water *(don't forget conservation before reuse)*
❑ Dispose of water safely
❑ Improve sanitation
❑ Reduce pollution
❑ Save septic
❑ Save money
❑ Feel good
❑ Demonstration *(it should still justify itself ecologically/economically)*
❑ Other _____

Education Goals

Use the design and construction process and visible systems in the home to educate ❑ residents, ❑ clients, ❑ employees, ❑ subcontractors, and the ❑ general public about environmental impacts of buildings and how these impacts can be minimized.

Context

Climate

Latitude _____
Elevation _____
Annual rainfall _____
Evapotranspiration (in/week) Min_____Max_____
Typical max duration w/o significant rain _____
Growing season (frost to frost) _____
Minimum temperatures _____
Duration of snow cover _____
Solar exposure (directions) _____
Hours lost from sunrise _____, sunset ____due to surrounding geography and trees
Typical wind direction, intensity patterns

Micro climate *(shading, frost pockets, heat collectors, windy and sheltered areas, etc.)*

Greenhouse possible? Y / N *(good for cold, wet, low perk sites)*

Forces of Nature

Predictable disasters, which may affect the design:
❑ Flooding
❑ Torrential rain
❑ Landslide
❑ Fire
❑ Very high wind
❑ Extreme drought
❑ Extreme cold

Slope

Is the irrigated area below greywater sources? Y/N
Slope % _____ Slope aspect (orientation):
(Note: a Branched Drain system on a 2% slope takes four times the labor to build than one on a 4% slope. If the slope is under 2%, it will be very challenging.)

Are there erosion and/or slope stability (landslide) issues?

Soil Perk and Groundwater

Soil type(s): _____
Soil fertility: _____
Digging ease: _____
Permeability (has there been a perk test?):
minutes/in _____ location_____
minutes/in _____ location_____
minutes/in _____ location_____
(Note location(s) and values of perk test on site map)
Mini. seasonal groundwater depth, seasonal variation:
____ low ____ high groundwater
Where does runoff go?
Distance to nearest year-round surface water_____
Distance to nearest seasonal surface water_____
Character of nearby surface waters?

Water Supply

Prospective and existing water sources:
❑ Well _____ gpm
Depth of water table in wet ____, dry season _____
❑ Spring _____ gpm (minimum)
❑ Meter _____ (size)
❑ Rainwater harvesting
❑ Runoff harvesting
❑ Other _____
How is your water supply / water security constrained by power supply, economic, ecological, or availability considerations?

Quantity of water: ❑ lots ❑ medium ❑ little
Security of water: ❑ very secure ❑ medium ❑ precarious
How much does water cost? _____
Volume of on-site water storage _____
What are the water security issues? (E.g., no power = no water = dead fruit trees in a month)
Consider if it's helpful to move a water source (*washer, outside shower, etc.)* or to create a new water source. *It's advantageous for water sources to be located high on the site; you can water more area.*

Existing Wastewater Treatment Facilities

❑ Septic: is it failing? Y / N
❑ Sewer: Where does it go? _____
❑ Greywater system: Is it functioning satisfactorily?
❑ yes ❑ no ❑ sort of; If not, how?
❑ Composting toilet
❑ Constructed wetland
❑ Other: _____
Special wastewater disposal constraints?

Views and Privacy

Views you want to open/preserve
New visual/auditory screening you want

How do the desires of the other stakeholders—spouse, children, neighbors—differ from yours?

Regulatory Climate

Will the project be permitted? Y / N
Might it be inspected as part of another project? Y / N
Applicable greywater code? Other legalities?

Neighborhood appropriateness issues?

Time and Money Parameters

What are the budget constraints?

Do you own the land? Y / N
How long are you planning to stay there?_____
Is resale value a concern? Y / N
Are there time and money constraints for maintenance, repair, and replacement?

Is it imperative that the system meet a particular economic payback timetable, or is doing the ecological thing the overriding concern?

How much of your own time can/ will you be putting into the project?

Availability of Materials and Skilled Labor

What building materials are available on site/locally?
Where are plumbing parts and plants coming from?
Are biocompatible cleaners available? Y / N *(See oasisdesign.net/ [?] for list of plant-friendly cleaners)*
Different apects of construction? [what does this mean?]
Who is going to do the installation?
Will there be a person responsible for maintenance?
What are the maintenance goals or constraints?

Residents/ Users

Who will be in the space?

Pending changes in users/ use?
To what degree are the users interested in understanding/ maintaining the system?
Average population _____
Minimum population _____
Peak population _____
Duration and nature of peak _____
Max continuous days unoccupied in dry season _____
Is the system public? ❑ yes ❑ no

Context Drawings

Site Plan

A ⅛" = 1' scale, 1' contour map[m] of the site and a ¼" = 1' plan of the structures involved with various layers (topography, aerial photo, plants, structures, utilities) would be ideal, but any sort of sketch is a help. This map would ideally show **topography, property lines, septic tanks, leach lines, wells, water storage, surface waters, structures, hardscape, grading, major vegetation, and irrigated areas**, existing and planned. Note protection zones for wells or surface waters. **Also note location and amounts of runoff** (in gal/in. of rain, for example). Aerial photos are useful for locating vegetation.
If you're sharing this information with people involved in the project off-site, take snapshots showing general feeling of the site and any special features, indicating the location and the direction of each shot with a letter and arrow on the site map.
Make copies of the map and sketch the possible ways to connect the greywater sources with irrigation/ treatment areas (next steps below).

System Elevations

Check the critical elevation relationships between features such as buildings, foundations, walkways, greywater sources, septic or sewer inlet, and irrigated areas.
For private water supply, rainwater harvesting, Branched Drain, and Green Septic system installations, I strongly suggest making a table of elevations and an elevation view drawing, or noting the elevations and slopes on the site map.

Irrigation Needs/ Landscape

Native vegetation type(s):
Land use(s), existing and planned, including vegetation:
Is the landscape fenced/free of browsing animals? Y/N
Important trees to irrigate?
Irrigated area: Current _____
Potential _____
Existing freshwater consumption?
What is the existing/ planned freshwater irrigation system?

Mark potential irrigation areas on site map with quantities of water in gallons per day or week.

General Design

General Ecological Design Checklist

- ❑ • Project is in scale to intended use
- ❑ • Project is not inherently wasteful or damaging
- ❑ • Project is necessary
- ❑ • Project is suited for and sensitive to site
- ❑ • Project does not create excessive impact off site
- ❑ • Ecologically/economically cost effective
- ❑ • Special features enhance project's enjoyabiltity, utility, value

❑ • Energy and resource efficiency is considered in the design of the project's processes or products.
❑ • Project design facilitates resource-efficient lifestyle choices
❑ • Special use facilities provide for efficient conversion to some other future use if this is a possibility

Consciously Chosen Technologies

The presense or absence of key technologies dramatically shapes the flavor of a home and the lifestyle of the people who live there. For example, even a five-minute walk from car access into the forest shifts a home from the world market economy towards the forest economy.
Even if you choose, for example, to have electricity, you can do as we've done periodically and shut it off once in a while for "electricity free Sundays.."A chance to enjoy the dark and remember other ways of doing things.
How is your water, gas, electrical, propane, internet & telephone supply constrained by economic, ecological or availability considerations?

Chosen technologies:

Motor vehicle access L · · · · · · H

Car ownership L · · · · · · H

❑ Internet
❑ TV
❑ Phone
❑ Grid electricity
❑ Propane/gas
❑ Tractor

Integration of Natural Living and Modern Comforts

Easy flow between inside and outside spaces; simplest, most nature-close spaces and technologies available and attractive, easy transition to more artificial arrangement when truly necessary.
Check ones desired:
❑ Daylighting
❑ Compact florescents/dimmers
❑ Outside sleeping
❑ Inside sleeping
❑ Cold plunge
❑ Outdoor shower
❑ Wood burning bathtub
❑ Inside bath
❑ Outside fireplace
❑ Outside kitchen
❑ Inside kitchen;
❑ Root cellar
❑ Fridge
❑ Solar hot water
❑ Electric back up
❑ Gas back up
❑ Wood back up
❑ passive solar heat
❑ Wood heat
❑ Electric/gas heat

Accumulated Wisdom

If it ain't broke, don't fix it.
If you can live equally well without it, don't do it.
Don't do it until or unless it is necessary.
Do it once, or do an extremely quick draft/ test installation first, then do it once.
Always have someone involved who knows how to do the thing if anything of significance is at stake.
Wait until the design functions perfectly until building anything
Defer finalizing the design until as late as possible in the building process
Always keep the whole in mind; each new element supports the new whole.
Sequence construction for maximum efficiency
Consider building in phases so the savings from ecological features can accumulate to fund the capital cost of more ecological features.

Water works

Supply

Rain= primary water source
Greywater = secondary water source
Spring, well, city = tertiary water source
❑ • Spring or creek diversion
❑ Ram pump
❑ • Rainwater harvesting
❑ Well (❑ Horizontal)
❑ • Cascading/reuse/recycling
❑ • Dual plumbing for different water qualities

Storage

❑ • Soil/groundwater storage/ recharge
❑ • Tank(s—*two is good*) Size:_____
❑ Pond Size:_____
❑ Cistern/swimming pool Size:_____

Treatment/Filtration

❑ • Design system so no treatment is needed
❑ Whole house particle, Carbon filter
❑ R/O unit *(can feed cold plunge, fountain)*
❑ Sand filter
❑ Reverse osmosis

Efficient Fixtures

❑ Waterless toilet ❑ Waterless urinal
❑ Ultra low flow toilet
❑ Hand wash basin for toilet recycle
❑ • Eco-luxury bathing chamber
❑ • Wood burning bathtub/hand laundry
❑ • Furo/ re-heatable tub
❑ • Piped/carry hybrid supply plumbing
❑ • Outdoor shower
❑ Horizontal axis washing machine
❑ Sink aerators
❑ Hot tub ❑ Solar ❑ Wood-heated

Wastewater

❑ • Greywater system(s)
❑ • Green septic *(water reusing leachfield)*
❑ Constructed wetland
❑ • R/O purifier cascade
❑ Watson wick

Toilet

❑ • Composting toilet *(about forty varieties)*

❑ • Squat flush toilet
❑ Low flow toilet

Runoff Management

❑ Own watershed—make projects their own watersheds, if possible. On small lots, it usually is possible to arrange.
❑ Zero runoff—no water leaves on the surface, and no runoff comes in in an uncontrolled way.

• This can typically be accomplished with mico-grading; changes of less than a foot, typically berms around the edges, mulch basins and swales within, to direct runoff away from the house and cause it to percolate in where there are plants that can take advantage of it.

❑ Divert outside runoff water in—runoff from adjoining properties, roads, etc. can often be diverted into the property for flushing salts and reducing irrigation need.
❑ High permeability—to absorb more runoff internally, the land can be a thickly mulch and planted series of basins and swales, with minimal hardscape.

Rainwater harvesting

❑ Rooftop rainwater harvesting _____gal storage
❑ Gutter screens
❑ Greywater system tie-in
❑ Drip irrigation system tie-in

House

Siting and Land Use

❑ Value site resources *Early in the siting process carry out a careful site evaluation: solar access, soils, vegetation, water resources, important natural areas, etc., and let this information guide the design.*
❑ Renovate older buildings *Conscientiously renovating existing buildings is the most sustainable construction.*
❑ Create community *Development patterns can either inhibit or contribute to the establishment of strong communities and neighborhoods. Creation of cohesive communities should be a high priority.*
❑ Encourage in-fill and mixed-use development *In-fill development that increases density is inherently better than building on undeveloped (greenfield) sites. Mixed-use development, in which residential and commercial uses are intermingled, can reduce automobile use and help to create healthy communities.*
❑ Minimize automobile dependence *Locate buildings to provide access to public transportation, bicycle paths, and walking access to basic services. Commuting can also be reduced by working at home--consider home office/workshop needs with layout and wiring.*
❑ Locate buildings to minimize environmental impact: *Cluster buildings or build attached units to preserve open space and wildlife habitats, avoid especially sensitive areas including wetlands, and keep roads and service lines short. Build parkways, not driveways. Leave the most pristine areas untouched, and look for areas that have been previously damaged to build on. Seek to restore damaged ecosystems.*
❑ Provide responsible on-site water management: *Design landscapes to absorb rainwater runoff (stormwater) rather than having to carry it off-site in storm sewers. In arid areas, rooftop water catchment systems should be considered for collecting rainwater and using it for landscape irrigation.*
❑ Situate buildings to benefit from existing vegetation: *Trees on the east and west sides of a building can dramatically reduce cooling loads. Hedge rows and shrubbery can block cold winter winds or help channel cool summer breezes into buildings.*

Size, Durability, Adaptability

Square feet _____
Square feet per person: _____

Optimize interior space through careful design so that the overall building size--and resource use in constructing and operating it--are kept to a minimum. Build cozy, soulful spaces with low rooflines, nooks, and built-in furniture. This is crucial.. 120 square feet for two people is possible, 200 square feet per person is generous, at 500+ square feet per person ecology is out the window and domestic help shifts from luxury to necessity. See: oasisdesign.net/faq/green4000ft2home.htm

Design life _____ *Design for durability: To get the most value from the environmental impacts of building, the structure must be maintainable, built to last, and repairable. A building with timeless architecture will be unlikely to be razed when fashions change. In earthquake/hurricane country, build resistant structures that won't fail easily, and that won't be too big of a mess if they do. In fire country, build so the structure either can't burn, or will burn clean.*

Design for future adaptability. Other uses provided for:

Functions/Rooms

❑ Main entry / windcatcher
❑ • Outside sleeping spaces
❑ • Sheltered nest
❑ • Teenage space
❑ Guest space
❑ Office
❑ Art studio
❑ Kitchen
❑ Bulk food storage
❑ Dining
❑ Dance/yoga floor
❑ Bathroom (inside)
❑ • Bathroom (outside?)
❑ • Outdoor bedroom
❑ • Workshop--wood, metal, electrical, plumbing
❑ Sewing area
❑ • Kid fort
❑ Rental bedroom
❑ Storage, Covered, secure
❑ Storage, Covered
❑ Storage, outdoor

Space Cooling

❑ • Deciduous shade trees for heat gain reduction
❑ • Evaporative cooling from plants
❑ • Summer hooded skylights
❑ Natural convection-powered air circulation
❑ Swamp cooler ❑ Fans
❑ Underground cooling
❑ Efficient or ❑ no A/C

Insulation

❑ Good insulation/weather-stripping
❑ Efficient windows
❑ Wall, ❑ roof, ❑ floor insulation
Reflective/ low emissive coloration

Materials

❑ Optimize material use: *Minimize waste , choose materials and components that can be reused or recycled.*

❑ Use durable products and materials: *a product that lasts longer or requires less maintenance usually saves energy. and contributes less solid waste fire /water/rot/termite resistance*

❑ Choose low-maintenance building materials

❑ building materials with low embodied energy

❑ Locally produced building materials: *Transportation is costly in both energy use and pollution generation.*

❑ Building products made from recycled materials: *A few examples of materials with recycled content are cellulose insulation, Homasote®, Thermo-ply®, floor tile made from ground glass, and recycled plastic lumber.*

❑ Use salvaged building materials *lumber, millwork, certain plumbing fixtures, and hardware. Test for lead paint and asbestos, and don't sacrifice energy efficiency or water efficiency by reusing old windows or toilets. On remodel, save useful components of old structure.*

❑ Seek responsible wood supplies

❑ Avoid materials that will offgas pollutants: *Solvent-based finishes, adhesives, carpeting, particleboard*

❑ Minimize use of pressure-treated lumber: *Use detailing that will prevent soil contact and rot. Where possible, use alternatives such as recycled plastic lumber or naturally rot-resistant wood.*

Natural materials:

❑ Straw bale

❑ Adobe

❑ Stone

❑ Wood

❑ Bamboo

Materials can be reused/recycled at end of project's life

Recycling areas: compost, mulch, firewood, building materials, soil

Low Toxicity Materials

❑ Avoid ozone-depleting chemicals *in mechanical equipment and insulation: CFCs have been phased out, but their primary replacements--HCFCs--also damage the ozone layer and should be avoided where possible. Avoid foam insulation made with HCFCs. Reclaim CFCs when servicing or disposing of equipment.*

❑ Alternative termite treatments

Kitchen

❑ • Dish drying/ storage rack

❑ • Wood cook stove

❑ Through wall solar cooker

❑ Hay box

❑ • Root cellar

❑ Minimum size, efficient refrigerator

Small, Soulful Spaces

❑ Low ceilings, neat shapes

❑ Lofts

❑ Nooks

❑ Built in desks

❑ Balconies

❑ Deck

Efficient or Omitted Appliances

❑ **TV**—read, talk with each other, make love, watch the sunset…

❑ **Microwave**—pressure cooker for cooking, stove for reheating

❑ **Dryer**—line dry

❑ **Garbage disposal**—compost instead

❑ **Water softener** —use rainwater for hair and washing machine, hard water for everything else

❑ **Dishwasher** —use efficient dishrack-doesn't take any longer

❑ **Trash compactor**—don't buy much trash

❑ **Hair dryer**—towel, air dry

❑ **Air conditioner**—swamp cooler, good shading, ventilation and planting

❑ **Refrigerator**—cool box, temporary "canning" by reheating food in cooking vessels

Materials, Organization & Flows

❑ • Kitchen dish storage/ drying rack

❑ Recycling area

❑ • Box shelves

❑ Compost

❑ Firewood storage

Storage

❑ Indoor and ❑ outdoor

❑ Food storage; ❑ root cellar

Energy Efficiency

Passive solar heating, daylighting, and natural cooling can be incorporated cost-effectively into most buildings. Include solar water heating and photovoltaics--or design buildings for future solar installations.

❑ • Energy audits

❑ Solar, ❑ wind, or ❑ hydro electric power

❑ • Clothes line

Transportation

❑ Locate for easy access; *reduce transportation demand*

❑ Bike storage

❑ Parkways (short) not driveways (long)

❑ • Transport bikes

❑ Garden cart

❑ Advanced Chinese wheelbarrow

❑ Project facilitates use of transportation alternatives to single occupant car

❑ Showers

❑ Bike lockers/racks

Space Heating

❑ • Reflective evergreens for heat gain increase, wind chill reduction

❑ • Passive solar heating orientation and glazing

❑ high-performance windows *In southern climates, choose glazings with low solar heat gain*

❑ • Strategic pruning and planting for sun, shade and

wind
❑ tight construction
❑ high levels of insulation
❑ • Helpful thermal mass
❑ • Solar greenhouse
❑ • Floor heating
❑ Efficient woodstove
❑ Efficient or no fireplace
❑ Hydronic heating
❑ Co-generation
❑ Heat pump
❑ Efficient or ❑ no furnace
❑ Calculated overhangs

Lighting

❑ Daylighting
❑ Low/ appropriate lighting levels
❑ Timers/Occupancy sensors
❑ Efficient fixtures

Hot water

❑ Solar hot water
❑ Wood stove hot water
❑ • Inexpensive demand electric backup
❑ • Well-insulated hot water tanks and pipes
❑ Particle filter before heater
❑ Demand or ❑ efficient heater
❑ Coordinate with space heating
❑ No hot water recirculation or ❑ controlled recirc

Landscape

❑ Describe spatially on site map
❑ Record sun measurements
❑ Soil test
❑ Native plants
❑ Zeriscaping
❑ Efficient irrigation

Outdoor Living

Easy transition between indoor and outdoor living spaces L · · · · · · H
❑ • Sunny dry outdoor living space
❑ • Shady cool outdoor living space
❑ • Outdoor benches
❑ • Outdoor bed
❑ Privacy Screen ❑ Hedge ❑ Wall ❑ Fence
❑ Solar cooker
❑ • Outdoor fire pit/ fireplace
See also "toys," below.

Building Soil

❑ Truckload(s) of mulch and ❑ compost
❑ Green manure

Edible Landscape

❑ •Select fruit trees from the *intersection* of the following sets, Fruit which: A) residents will eat, B) can grow in this climate, C) have space for growing, D) for which there is energy to maintain and harvest. *See oasisdesign.net/landscaping/fruittrees.htm*
❑ Herb garden
❑ Kitchen garden
❑ Propagation area
❑ Brush burner (wood burning bathtub)
❑ Compost
❑ Microclimate modification

Freshwater Irrigation System

❑ Low water use plantings
❑ • Water reuse
❑ • Drip irrigation
❑ Controllers ❑ Soil moisture sensors
❑ With zones corresponding to greywater zones.
❑ Drip
❑ Rain shutoff
❑ Rain flushing

Animals

❑ Wildlife habitat
❑ Water for animals to drink
❑ Domestic animals; ❑ chickens, ❑ bees, ❑ goats…

Greywater System Design

Indoor water use

Connect Greywater Sources with Irrigation/Disposal Areas

Choose a percentage of irrigation need to meet with greywater in different irrigation zones:
Total greywater ____ / ____total irrigation need = ____% of irrigation theoretically attainable via greywater
Check loading rate:
____ gal/day greywater / ____ ft^2 irrigated area = ____ gal per ft^2 (check against acceptable ranges by soil type in Table 2.3, p. 13, *New Create an Oasis*). Make sure you distribute the water to enough plants and over a wide enough area that you don't over water.
Now that you know where the greywater is coming from and where it's going, you can design the hardware...

Greywater Sources

Fill out table, mark on site map with quantities of greywater.

Source	Possible to irrigate downhill (y/n)?	Plumbing accessible (y/n)?	Gallons per week	Quantity and variability of water, surges, conservation measures, comments
❑ Washing machine				
❑ Shower 1				
❑ Bathtub 1				
❑ Bathroom sink 1				
❑ Toilet water 1				
❑ Shower 2				
❑ Bathtub 2				
❑ Bathroom sink 2				
❑ Toilet water 2				
❑ Kitchen sink				
❑ Utility sink				
❑ R/O water drain				
❑ Outdoor shower				

☐ Total gallons destined for reuse

Note: dishwater, water softener flush not recommended

Greywater Collection Plumbing

❑ Conventional or ❑ radical plumbing?
❑ Lump flows together or ❑ split?
Two or more irrigation zones if necessary
Pipe size? _____
Diverter valve locations, if any:
Surge tanks, if needed Y /N
Dosing devices, if needed Y /N
Flexibility for possible future reconfiguration

Rainwater/ Runoff Flushing System

See *Create an Oasis, Rainwater Harvesting for Drylands.*[3]

Greywater Distribution Plumbing

Choose a greywater distribution system. See System Selection Chart, *New Create an Oasis*, p. 52.

Greywater Receiving Landscape and Plants

Choose a greywater receiving system (e.g. mulch basins, subsoil infiltration galleys) and make sure it is adequately sized for expected max surge: ____ gal.

Greywater System Construction, Use

See Greywater System Checklist by Profession (p. 1); plumber, landscaper, gutter installer, system users.

Greywater System Maintenance, Evaluation

Check how the system fares over time and with the change of seasons.
Avoid stagnant water—dig a little below the greywater outlets: is the soil anaerobic (black, or with bad smell)? Y / N
Are there new plant roots? Y / N
Are the plants happy? Y / N
Are there enough plants to use the greywater? Y / N
Is the greywater controlled? Y/ N
Is the greywater well-distributed for irrigation? Y / N

Greywater System Checklist by Profession

Architect/ Engineer

- ❑ **Site house uphill from area to be irrigated**—this is basic, like facing the building south for solar heating.
- ❑ **Specify floors a foot or two above grade**—so the plumbing reaches the yard at grade.
- ❑ **Make all the plumbing accessible**—for example, in a crawl space. If the plumbing must be entombed under a slab, plumb the greywater totally separate from the blackwater. The vents may be combined.

Greywater System Designer/ Owner

- ❑ **Establish the system goals clearly** at the outset
- ❑ **Establish early whether the greywater is to be joined before being split**, or if each fixture set has its own independent outlet—this totally changes the plumbing.
- ❑ **Gather special order tools, materials and plants early**.
- ❑ **Keep an eye on the others** to make sure the system is implemented correctly.

General Contractor

- ❑ **Keep an eye on the plumber**.

Plumber

- ❑ **Plumb everything as high as possible** in elevation and conserve fall along the whole length of the pipes. *Don't forget this in your bid*. This will take more time, in some cases more than twice as much time.
- ❑ **Plumb diversions downstream from traps and vents**. Plumbing the greywater lines totally separate until outside the house is also a good way to go.
- ❑ Use our *Greywater Collection Plumbing and Stub Outs Inspection Checklist*[2] for more specifics.

Landscaper

- ❑ **Priority use for greywater is shady, cool, fruit-filled outdoor living space right by the house**.
- ❑ **Think far ahead**—as long as there is a house, greywater will be coming out of it. Plants will grow and plumbing isn't easy to change.
- ❑ **Put water loving plants where there is more greywater**.
- ❑ **Design the irrigation system so that each greywater zone has a corresponding freshwater irrigation zone** that can be turned off independently. This is the only way to actualize water savings.
- ❑ **Use appropriate plants**.
- ❑ **Plant the plants at the same time as the greywater earthworks and distribution plumbing are installed**—this leads to best results.

Gutter Installer

- ❑ **Make rainwater downspouts divertable to irrigated areas** for rainwater flushing of accumulated salts, greywater recharge, and flood control. *Do not permanently dedicate rainwater to irrigated areas except in the driest climates!*
- ❑ **Design gutters and downspouts for filtration, pressure** if necessary.

Inspector

- ❑ **Ensure that systems are designed and built well**, using performance of familiar systems as an indicator of quality of unfamiliar systems.
- ❑ **Rise above role of policing for cheating on minimum standards, and fulfill potential as advocate**/ resource for builders who are investing effort to reduce the overall impacts from the built environment.
- ❑ Use our *Greywater Collection Plumbing and Stub Outs Inspection Checklist*[2] for more specifics.

System Users

- ❑ **Don't put toxic chemicals down the drain**—at least divert greywater to the septic/sewer when you do.
- ❑ **Divert greywater elsewhere if soil is too saturated**.
- ❑ **Turn backup irrigation on/ off** when no greywater
- ❑ Maintain the system as needed.

Safety

Avoid potential health hazards: radon, mold, pesticides, vermin. Follow recommended practices to minimize radon entry into the building and provide for future mitigation if necessary. Provide detailing that will avoid moisture problems, which could cause mold and mildew growth. Design insect and rodent-resistant detailing that will require minimal use of pesticides.

Child-safe/ Child-proof

- ❑ Water tanks, pools hot tubs and ponds child safe
- ❑ Drop offs blocked or marked
- ❑ Boiling hot solar/ wood heated water tempered [is 'tempered' what you wrote?]
- ❑ Woodstoves safe
- ❑ Poisonous plants, etc. removed

Structural Safety

- ❑ • Proper engineering, *diagonal bracing, structural details for earthquake, snow, hurricane. Avoid waste from structural over-engineering. Simplify building geometry.*

Fire Safety

Best strategies are to build so that:

- ❑ Your structure cannot burn, or
- ❑ Your structure will burn clean
- ❑ A combination of a) and b) is often ideal.

- ❑ Design escape routes for people
- ❑ Smoke alarms
- ❑ • Safe woodstove installations
- ❑ Safe wiring, ground Fault Interrupts, etc.
- ❑ Fire hoses, adequate water supply, training
- ❑ Fire sprinklers ❑ outdoor
- ❑ Foam unit
- ❑ Fire safe storage
- ❑ Fire bunker

Security

- ❑ Lockable

Beauty, Spirit, & Toys

- ❑ Slide
- ❑ Swing
- ❑ Warm wading pool
- ❑ Tree house/fort
- ❑ Bean tipi
- ❑ • Hammock
- ❑ Sculptures and artwork

Good luck, and don't forget your before pictures!

This and other forms may be downloaded free from oasisdesign.net/design/consult.

Portions of this list were adapted from http://www.buildinggreen.com/ebn/checklist.cfm with permission.