Greywater Site Assessment/System Checklist

 Site _____ Date_____

Fill out **Site Assessment**—the first three pages—for an Oasis design consultation. This whole checklist serves also as a guide for a DIY system, or to orient others to your project. Full information on these points is in the book *The New Create an Oasis with Greywater.*[1]

This is a comprehensive list; most installations won't need all this info. This map is not the terrain. This sheet 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.

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.) If you are working with other people, this form, along with a site map, can serve to orient them.*

***Reminder: Careful attention to the context will pay good dividends.** Greywater systems are affected by more variables than most systems in natural building, and to a greater degree. A change in one of any number of variables can change the whole design.*

Good luck! —The Oasis Design Team

Site Assessment

Goals

General Goals

What are the guiding philosophies and aesthetic? (E.g., fancy gated subdivision, shack in hippie commune)

What perfection standard* are you aiming for?

Hygiene standard?

Greywater system goals (check all that apply)

- ❑ 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)*
- ❑ Other _____

Landscape goals (check all that apply)

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

Context

Climate

Latitude _____
Elevation _____
Annual rainfall _____
Maximum evapotranspiration (inches or cm / week) _____
Minimum evapotranspiration (inches or cm / week) _____
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
Greenhouse possible? _____ (*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

Slope

Is the area to be irrigated below the greywater source?
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)

Minimum 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_____

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)

To what degree do you want to or have to conserve?

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?
❑ 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?

Regulatory Climate

Will the project be permitted? ❑ yes ❑ no
Might it be inspected later as part of another project? ❑ yes ❑ no
What is the applicable greywater code? Other legalities?

Neighborhood appropriateness?

Economics

Budget constraints?

Do you own the land where the project is to be built?

How long are you planning to stay there?

Is resale value a concern?

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?

Availability of Exotic Materials and Skilled Labor

Where are plumbing parts and plants coming from?

Are biocompatible cleaners available?

Who is going to do the installation?

Population of Water Users

Average population _____
Minimum population _____
Peak population _____
Duration and nature of peak _____
Max continuous days unoccupied during dry season _____
Pending changes in users/ use?

To what degree are the users interested in understanding/ maintaining the system?

Is the system public? ❑ yes ❑ no
Will there be a person responsible for maintenance?

What are the maintenance goals or constraints?

Site Plan

A ⅛″ = 1′ scale, 1′ contour map[m] of the site and a ¼″ = 1′ plan of the structures involved would be ideal, but any sort of sketch is a help. This map would ideally show **topography, property lines, septic tanks, leach lines, wells, surface waters, buildings, 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 Branched Drain and Green Septic system installations, I strongly suggest making an elevation view drawing. Otherwise, note the elevations on the site map, checking that there is enough slope.

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[*] *Standard for the aesthetics, efficiency, etc. of a system; could be 70, 90, 95, 98% perfect. Each jump to the next highest of these standards roughly doubles the amount of time, money, materials required, not to mention the negative environmental impact.*

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

Irrigation Needs/ Landscape

Native vegetation type(s):

Land use(s), existing and planned:

Is the landscape fenced or free of browsing animals? ❑ yes ❑ no

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.

End of site assessment

System Design

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 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
Shutoff valves?
Surge tanks, if any
Dosing devices, if any
Flexibility for possible future reconfiguration

Rainwater/ Runoff Flushing System

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

Supplemental Freshwater Irrigation System

❑ With zones corresponding to greywater zones.

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.

Construction, Use

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

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)? Are there new plant roots?
Are the plants happy?
Are there enough plants to use the greywater?
Is the greywater controlled?
Is the greywater well-distributed for irrigation?

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**—or at least divert greywater to the septic/sewer when you do.
- ❑ **Divert greywater elsewhere if garden soil is too saturated**.
- ❑ **Use backup irrigation** when there is no greywater, and turn it off when there is.
- ❑ **Maintain the system** as needed.

References

1. *The New Create an Oasis with Greywater* book, available from Oasis Design: http://oasisdesign.net.
2. This and other forms may be downloaded free from "Greywater Central": http://oasisdesign.net/greywater.