Exercise 2: Water Saving Calculation

Group 1

On the Water Saving Worsheet, there is a sample building that is trying to save water. There is a major renovation planned of all bathrooms and kitchens. On the next tab you'll find the existing water fixtures in the building, the annual water usage and cost and the per apartment assumed usage. Calculate savings, payback and try to reduce the per person daily consumption to 40-50 gallons per day by selecting a combination of faucet aerators, showerheads, toilets. Fill in all blue cells. The orange cells contain formulas and will populate when the other cells are completed.

For Your reference:

G= Gallons
GPF= Gallons per flush
GPM= Gallons per minute
HCF= Hundred Cubic Feet of water OR (Gallons /7.481)/100

GROUP 1: Water Saving Exercise

Building Info	
Total SF	100000
# of Units	100
1 BD	50
2 BD	50
# of Baths	100
# of Kitchens	100
# of People	225
Gallons/person/day	92

Fixture Info	#	Flow Rate (gpm)	Proposed (gpm)
# of Bathroom Sinks	100	2	0.5
# of Showerheads	100	3.75	1.75
# of Kitchen Sinks	100	2.5	1.5
# of Toilets	100	5	1.6

Cost*	*Labor is reduced for bundled package	
Fixture	**$/ fixture**	**$/100 Units**
Bathroom Sink	$20	$2,000
Kitchen Sink	$20	$2,000
Shower	$75	$7,500
Toilet	$450	$45,000
	Total	**$56,500**

Assumptions	*Assumes dishes are hand washed.			
Fixture	**# of Uses per Day/ Person**	**Total Duration (min.)**	**Flow Rate (gpm)**	**Total Water Use/ Day/ Person**
Bathroom Sink	4	6	2	12
Kitchen Sink*	4	15	2.5	37.5
Shower	1	8	3.75	30
Toilet	3	1	4	12
			Total	**91.5**

Proposed	*Assumes dishes are hand washed.			
Fixture	**# of Uses per Day/ Person**	**Total Duration (min.)**	**Flow Rate (gpm)**	**Total Water Use/ Day/ Person**
Bathroom Sink	4	6		0
Kitchen Sink*	4	15		0
Shower	1	8		0
Toilet	3	1		0
			Total	**0**

Existing Water Usage		Proposed Water Savings	
Daily Water Use (g)	22,000	**Daily Water Savings (g)**	
Annual Water Use (g)	8,030,000	**Annual Water Savings (g)**	
Annual Water Use (HCF)	10,734	**Annual Water Savings (HCF)**	0
Rate $/HCF	$ 5.00	**Annual Water Savings ($)**	$0
Annual Water Bill	$53,669	**Payback (yr)**	#DIV/0!

Exercise 2: Water Saving Calculation

Group 2

On the Water Saving Worsheet, there is a sample building that is trying to save water. There are no renovations planned. There are 2 packages for improvement. The only difference is one package has a full toilet replacement and the other only calls for replacement of all flappers. Complete all blue cells. Once complete determine which package is better to implement. The orange cells contain formulas and will populate when the other cells are completed.

For Your reference:

G= Gallons
GPF= Gallons per flush
GPM= Gallons per minute
HCF= Hundred Cubic Feet of water OR (Gallons /7.481)/100

GROUP 1: Water Saving Exercise

Building Info		Fixture Info	#	Flow Rate (gpm)	Proposed (gpm)
Total SF	100000	# of Bathroom Sinks	100	2	0.5
# of Units	100	# of Showerheads	100	3.75	1.75
1 BD	50	# of Kitchen Sinks	100	2.5	1.5
2 BD	50	# of Toilets	100	5	1.6
# of Baths	100	**Existing Water Usage**			
# of Kitchens	100	**Daily Water Use (g)**	22,000		
# of People	225	**Annual Water Use (g)**	8,030,000		
Gallons/person/day	92	**Annual Water Use (HCF)**	10,734		
		Rate $/HCF	$ 5		
		Annual Water Bill	$ 53,669		

Assumptions	**Assumes dishes are hand washed.*			
Fixture	**# of Uses per Day/ Person**	**Total Duration (min.)**	**Flow Rate (gpm)**	**Total Water Use/ Day/ Person**
Bathroom Sink	4	6	2	12
Kitchen Sink*	4	15	2.5	37.5
Shower	1	8	3.75	30
Toilet	3	1	4	12
			Total	**91.5**

Package 1*	*Assumes dishes are hand washed.				Package 1**		
Fixture	# of Uses per Day/ Person	Duration (min.)	Flow Rate (gpm)	Total Water Use/ Day/ Person	Fixture	$/ fixture	$/100 Units
Bathroom Sink	4	6	0.5	3	Bathroom Sink	$20	$2,000
Kitchen Sink*	4	15	1.75	26.25	Kitchen Sink	$20	$2,000
Shower	1	8	1.5	12	Shower	$75	$7,500
Replace Flapper	3	1	3	9	Replace Flapper	$20	$2,000
			Total	50.25		Total	$13,500
					**Labor is reduced for bundled package		

Package 2*	*Assumes dishes are hand washed.				Package 2**		
Fixture	# of Uses per Day/ Person	Duration (min.)	Flow Rate (gpm)	Total Water Use/ Day/ Person	Fixture	$/ fixture	$/100 Units
Bathroom Sink	4	6	0.5	3	Bathroom Sink	$20	$2,000
Kitchen Sink*	4	15	1.75	26.25	Kitchen Sink	$20	$2,000
Shower	1	8	1.5	12	Shower	$75	$7,500
Toilet	3	1	1.28	3.84	Toilet	$450	$45,000
			Total	45.09		Total	$56,500
					**Labor is reduced for bundled package		

Package 1 Proposed Water Savings	
Daily Water Savings (g)	
Annual Water Savings (g)	
Annual Water Savings (HCF)	0.00
Annual Water Savings ($)	$0
Payback (yr)	#DIV/0!

Package 2 Proposed Water Savings	
Daily Water Savings (g)	
Annual Water Savings (g)	
Annual Water Savings (HCF)	0
Annual Water Savings ($)	$0
Payback (yr)	#DIV/0!