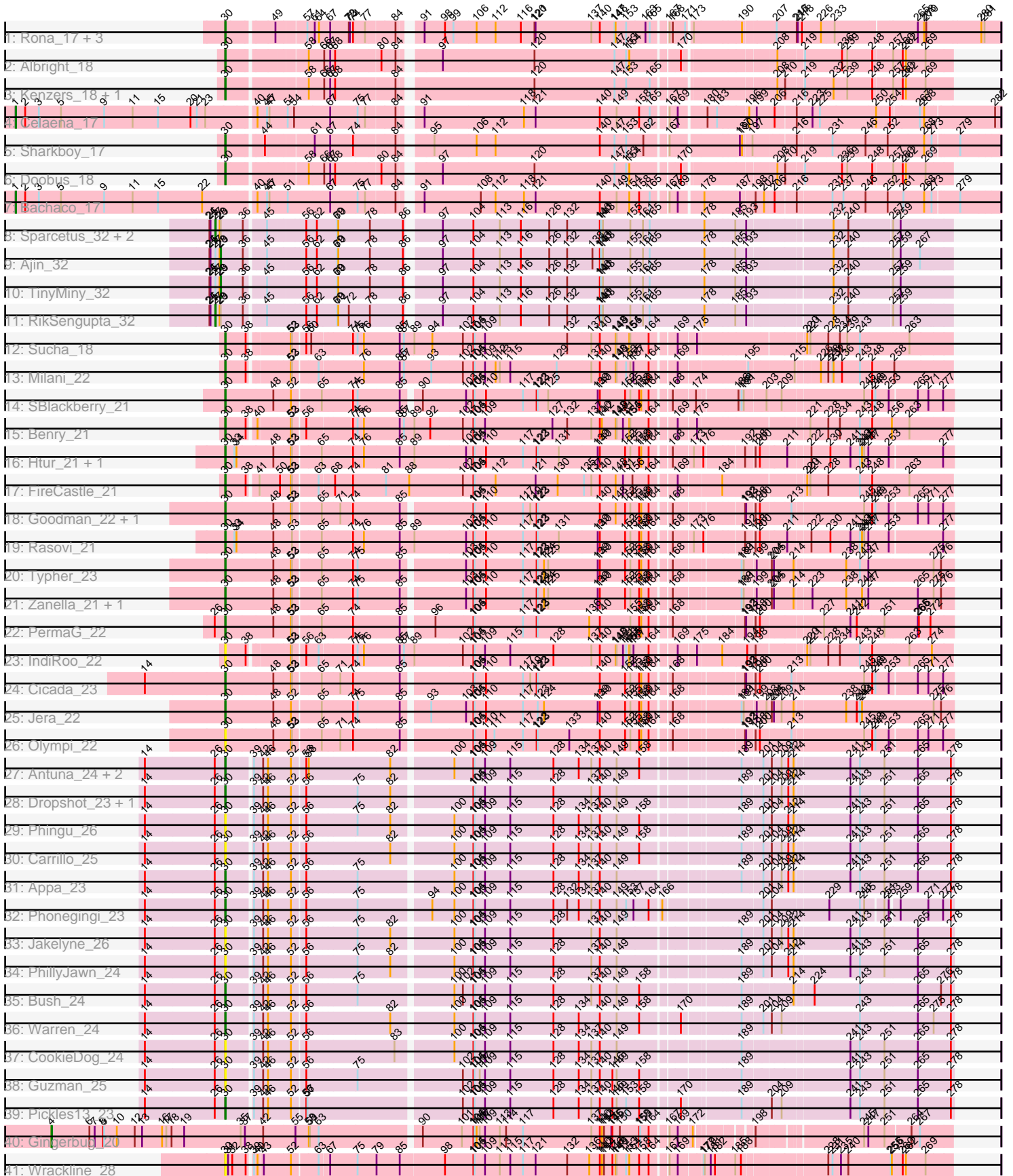


Pham 202995



Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

## Pham 202995 Report

This analysis was run 01/18/25 on database version 583.

Pham number 202995 has 53 members, 13 are drafts.

Phages represented in each track:

- Track 1 : Rona\_17, ChiliPepper\_17, Dismas\_17, Kieran\_17
- Track 2 : Albright\_18
- Track 3 : Kenzers\_18, Lynlen\_18
- Track 4 : Celaena\_17
- Track 5 : Sharkboy\_17
- Track 6 : Doobus\_18
- Track 7 : Bachaco\_17
- Track 8 : Sparcetus\_32, Kors\_33, LordBart\_32
- Track 9 : Ajin\_32
- Track 10 : TinyMiny\_32
- Track 11 : RikSengupta\_32
- Track 12 : Sucha\_18
- Track 13 : Milani\_22
- Track 14 : SBlackberry\_21
- Track 15 : Benry\_21
- Track 16 : Htur\_21, Linayshia\_21
- Track 17 : FireCastle\_21
- Track 18 : Goodman\_22, Johann\_22
- Track 19 : Rasovi\_21
- Track 20 : Typher\_23
- Track 21 : Zanella\_21, TurboVicky\_21
- Track 22 : PermaG\_22
- Track 23 : IndiRoo\_22
- Track 24 : Cicada\_23
- Track 25 : Jera\_22
- Track 26 : Olympi\_22
- Track 27 : Antuna\_24, Losacky\_26, MenE\_24
- Track 28 : Dropshot\_23, Blett\_24
- Track 29 : Phingu\_26
- Track 30 : Carrillo\_25
- Track 31 : Appa\_23
- Track 32 : Phonegingi\_23
- Track 33 : Jakelyne\_26
- Track 34 : PhillyJawn\_24
- Track 35 : Bush\_24
- Track 36 : Warren\_24
- Track 37 : CookieDog\_24

- Track 38 : Guzman\_25
- Track 39 : Pickles13\_23
- Track 40 : Gingerbug\_20
- Track 41 : Wrackline\_28

**Summary of Final Annotations (See graph section above for start numbers):**

The start number called the most often in the published annotations is 30, it was called in 33 of the 40 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Albright\_18, Antuna\_24, Appa\_23, Benry\_21, Blett\_24, Bush\_24, Carrillo\_25, ChiliPepper\_17, Cicada\_23, CookieDog\_24, Dismas\_17, Doobus\_18, Dropshot\_23, FireCastle\_21, Goodman\_22, Guzman\_25, Htur\_21, IndiRoo\_22, Jakelyne\_26, Jera\_22, Johann\_22, Kenzers\_18, Kieran\_17, Linayshia\_21, Losacky\_26, Lynlen\_18, MenE\_24, Milani\_22, Olympi\_22, PermaG\_22, PhillyJawn\_24, Phingu\_26, Phonegingi\_23, Pickles13\_23, Rasovi\_21, Rona\_17, SBlackberry\_21, Sharkboy\_17, Sucha\_18, TurboVicky\_21, Typher\_23, Warren\_24, Wrackline\_28, Zanella\_21,

Genes that have the "Most Annotated" start but do not call it:

- 

Genes that do not have the "Most Annotated" start:

- Ajin\_32, Bachaco\_17, Celaena\_17, Gingerbug\_20, Kors\_33, LordBart\_32, RikSengupta\_32, Sparcetus\_32, TinyMiny\_32,

**Summary by start number:**

Start 1:

- Found in 2 of 53 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 2 of 40
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Bachaco\_17 (EB), Celaena\_17 (EB),

Start 4:

- Found in 1 of 53 ( 1.9% ) of genes in pham
- Manual Annotations of this start: 1 of 40
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gingerbug\_20 (GF),

Start 27:

- Found in 6 of 53 ( 11.3% ) of genes in pham
- Manual Annotations of this start: 2 of 40
- Called 66.7% of time when present
- Phage (with cluster) where this start called: Kors\_33 (EF), LordBart\_32 (EF), RikSengupta\_32 (EF), Sparcetus\_32 (EF),

Start 29:

- Found in 6 of 53 ( 11.3% ) of genes in pham
- Manual Annotations of this start: 2 of 40

- Called 33.3% of time when present
- Phage (with cluster) where this start called: Ajin\_32 (EF), TinyMiny\_32 (EF),

Start 30:

- Found in 44 of 53 ( 83.0% ) of genes in pham
- Manual Annotations of this start: 33 of 40
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Albright\_18 (EB), Antuna\_24 (GA), Appa\_23 (GA), Berry\_21 (EJ), Blett\_24 (GA), Bush\_24 (GA), Carrillo\_25 (GA), ChiliPepper\_17 (EB), Cicada\_23 (EJ), CookieDog\_24 (GA), Dismas\_17 (EB), Doobus\_18 (EB), Dropshot\_23 (GA), FireCastle\_21 (EJ), Goodman\_22 (EJ), Guzman\_25 (GA), Htur\_21 (EJ), IndiRoo\_22 (EJ), Jakelyne\_26 (GA), Jera\_22 (EJ), Johann\_22 (EJ), Kenzers\_18 (EB), Kieran\_17 (EB), Linayshia\_21 (EJ), Losacky\_26 (GA), Lynlen\_18 (EB), MenE\_24 (GA), Milani\_22 (EJ), Olympi\_22 (EJ), PermaG\_22 (EJ), PhillyJawn\_24 (GA), Phingu\_26 (GA), Phonegingi\_23 (GA), Pickles13\_23 (GA), Rasovi\_21 (EJ), Rona\_17 (EB), SBlackberry\_21 (EJ), Sharkboy\_17 (EB), Sucha\_18 (EJ), TurboVicky\_21 (EJ), Typher\_23 (EJ), Warren\_24 (GA), Wrackline\_28 (GF), Zanella\_21 (EJ),

### Summary by clusters:

There are 5 clusters represented in this pham: GF, EF, EJ, GA, EB,

Info for manual annotations of cluster EB:

- Start number 1 was manually annotated 2 times for cluster EB.
- Start number 30 was manually annotated 9 times for cluster EB.

Info for manual annotations of cluster EF:

- Start number 27 was manually annotated 2 times for cluster EF.
- Start number 29 was manually annotated 2 times for cluster EF.

Info for manual annotations of cluster EJ:

- Start number 30 was manually annotated 15 times for cluster EJ.

Info for manual annotations of cluster GA:

- Start number 30 was manually annotated 9 times for cluster GA.

Info for manual annotations of cluster GF:

- Start number 4 was manually annotated 1 time for cluster GF.

### Gene Information:

Gene: Ajin\_32 Start: 18502, Stop: 20436, Start Num: 29

Candidate Starts for Ajin\_32:

(24, 18472), (25, 18475), (Start: 27 @18487 has 2 MA's), (28, 18499), (Start: 29 @18502 has 2 MA's), (36, 18562), (45, 18613), (56, 18703), (62, 18733), (69, 18790), (70, 18793), (78, 18883), (86, 18970), (97, 19051), (104, 19135), (113, 19210), (116, 19270), (126, 19351), (132, 19402), (138, 19474), (140, 19495), (141, 19498), (143, 19504), (155, 19582), (161, 19618), (165, 19636), (178, 19792), (185, 19876), (193, 19900), (232, 20116), (240, 20158), (257, 20275), (259, 20296), (267, 20347),

Gene: Albright\_18 Start: 13896, Stop: 15746, Start Num: 30

Candidate Starts for Albright\_18:

(Start: 30 @13896 has 33 MA's), (58, 14085), (66, 14127), (67, 14142), (68, 14154), (80, 14277), (84, 14316), (97, 14409), (120, 14667), (147, 14895), (153, 14928), (154, 14937), (170, 15060), (208, 15285), (219, 15351), (236, 15453), (239, 15468), (248, 15537), (257, 15585), (260, 15612), (262, 15621), (269, 15672),

Gene: Antuna\_24 Start: 14563, Stop: 16431, Start Num: 30

Candidate Starts for Antuna\_24:

(14, 14338), (26, 14533), (Start: 30 @14563 has 33 MA's), (39, 14623), (42, 14644), (46, 14656), (52, 14710), (56, 14743), (58, 14749), (82, 14965), (100, 15121), (104, 15175), (105, 15178), (109, 15208), (115, 15280), (128, 15403), (134, 15475), (137, 15508), (140, 15532), (149, 15580), (158, 15643), (189, 15877), (201, 15928), (204, 15946), (209, 15973), (212, 15991), (214, 16006), (241, 16153), (243, 16180), (251, 16243), (265, 16330), (278, 16423),

Gene: Appa\_23 Start: 14425, Stop: 16293, Start Num: 30

Candidate Starts for Appa\_23:

(14, 14200), (26, 14395), (Start: 30 @14425 has 33 MA's), (39, 14485), (42, 14506), (46, 14518), (52, 14572), (56, 14605), (75, 14734), (100, 14983), (104, 15037), (105, 15040), (109, 15070), (115, 15142), (128, 15265), (134, 15337), (137, 15370), (140, 15394), (149, 15442), (189, 15739), (201, 15790), (204, 15808), (209, 15835), (212, 15853), (214, 15868), (241, 16015), (243, 16042), (251, 16105), (265, 16192), (278, 16285),

Gene: Bachaco\_17 Start: 13521, Stop: 16133, Start Num: 1

Candidate Starts for Bachaco\_17:

(Start: 1 @13521 has 2 MA's), (2, 13548), (3, 13587), (5, 13650), (9, 13773), (11, 13854), (15, 13926), (22, 14052), (40, 14190), (45, 14217), (47, 14223), (51, 14271), (67, 14388), (75, 14463), (77, 14484), (84, 14562), (91, 14604), (108, 14760), (112, 14802), (118, 14883), (121, 14916), (140, 15099), (149, 15147), (154, 15183), (158, 15210), (165, 15240), (167, 15276), (169, 15297), (178, 15357), (187, 15453), (198, 15483), (202, 15507), (206, 15531), (216, 15585), (231, 15678), (237, 15708), (246, 15771), (252, 15834), (261, 15879), (268, 15936), (273, 15957), (279, 16023),

Gene: Benry\_21 Start: 14670, Stop: 16571, Start Num: 30

Candidate Starts for Benry\_21:

(Start: 30 @14670 has 33 MA's), (38, 14721), (40, 14739), (52, 14817), (53, 14820), (56, 14850), (74, 14967), (75, 14979), (76, 14997), (85, 15099), (87, 15111), (89, 15138), (92, 15183), (102, 15273), (104, 15303), (105, 15306), (109, 15336), (127, 15528), (132, 15570), (137, 15636), (140, 15660), (142, 15666), (148, 15705), (149, 15708), (151, 15726), (154, 15744), (155, 15747), (164, 15798), (169, 15858), (175, 15906), (221, 16194), (228, 16242), (234, 16275), (243, 16329), (248, 16362), (256, 16410), (263, 16452),

Gene: Blett\_24 Start: 14578, Stop: 16446, Start Num: 30

Candidate Starts for Blett\_24:

(14, 14353), (26, 14548), (Start: 30 @14578 has 33 MA's), (39, 14638), (42, 14659), (46, 14671), (52, 14725), (56, 14758), (75, 14887), (82, 14980), (104, 15190), (105, 15193), (109, 15223), (115, 15295), (128, 15418), (137, 15523), (140, 15547), (149, 15595), (189, 15892), (201, 15943), (204, 15961), (209, 15988), (212, 16006), (214, 16021), (241, 16168), (243, 16195), (251, 16258), (265, 16345), (278, 16438),

Gene: Bush\_24 Start: 14559, Stop: 16421, Start Num: 30

Candidate Starts for Bush\_24:

(14, 14334), (26, 14529), (Start: 30 @14559 has 33 MA's), (39, 14619), (42, 14640), (46, 14652), (52, 14706), (56, 14739), (75, 14868), (100, 15117), (102, 15141), (104, 15171), (105, 15174), (109, 15204), (115, 15276), (128, 15399), (137, 15504), (140, 15528), (149, 15576), (158, 15639), (189,

15867), (214, 15996), (224, 16041), (243, 16170), (265, 16320), (276, 16386), (278, 16413),

Gene: Carrillo\_25 Start: 14532, Stop: 16400, Start Num: 30

Candidate Starts for Carrillo\_25:

(14, 14307), (26, 14502), (Start: 30 @14532 has 33 MA's), (39, 14592), (42, 14613), (46, 14625), (52, 14679), (56, 14712), (82, 14934), (100, 15090), (104, 15144), (105, 15147), (109, 15177), (115, 15249), (128, 15372), (134, 15444), (137, 15477), (140, 15501), (149, 15549), (158, 15612), (189, 15846), (201, 15897), (204, 15915), (209, 15942), (212, 15960), (214, 15975), (241, 16122), (243, 16149), (251, 16212), (265, 16299), (278, 16392),

Gene: Celaena\_17 Start: 13457, Stop: 16075, Start Num: 1

Candidate Starts for Celaena\_17:

(Start: 1 @13457 has 2 MA's), (2, 13484), (3, 13523), (5, 13586), (9, 13709), (11, 13790), (15, 13862), (20, 13955), (21, 13973), (23, 13997), (40, 14126), (45, 14153), (47, 14159), (51, 14207), (54, 14225), (67, 14324), (75, 14399), (77, 14420), (84, 14498), (91, 14540), (118, 14819), (121, 14852), (140, 15035), (149, 15083), (158, 15146), (165, 15176), (167, 15212), (169, 15233), (180, 15302), (183, 15329), (196, 15407), (199, 15422), (206, 15473), (216, 15527), (223, 15572), (225, 15593), (250, 15746), (254, 15779), (267, 15857), (268, 15869), (282, 16058),

Gene: ChiliPepper\_17 Start: 13661, Stop: 15667, Start Num: 30

Candidate Starts for ChiliPepper\_17:

(Start: 30 @13661 has 33 MA's), (49, 13778), (57, 13847), (61, 13865), (64, 13877), (67, 13907), (72, 13958), (73, 13961), (74, 13970), (77, 14003), (84, 14081), (91, 14123), (98, 14180), (99, 14204), (106, 14267), (112, 14321), (116, 14393), (120, 14432), (121, 14435), (137, 14594), (140, 14618), (147, 14660), (148, 14663), (153, 14693), (163, 14747), (165, 14759), (167, 14795), (168, 14804), (171, 14837), (173, 14849), (190, 14978), (207, 15065), (216, 15122), (217, 15125), (218, 15137), (226, 15185), (233, 15221), (265, 15437), (268, 15455), (270, 15461), (280, 15611), (281, 15620),

Gene: Cicada\_23 Start: 16468, Stop: 18345, Start Num: 30

Candidate Starts for Cicada\_23:

(14, 16243), (Start: 30 @16468 has 33 MA's), (48, 16597), (52, 16636), (53, 16639), (65, 16708), (71, 16753), (74, 16789), (85, 16918), (104, 17098), (105, 17101), (110, 17134), (117, 17239), (119, 17260), (122, 17278), (123, 17281), (140, 17455), (152, 17527), (155, 17542), (158, 17566), (160, 17572), (164, 17593), (168, 17641), (192, 17809), (193, 17812), (198, 17833), (200, 17845), (213, 17920), (245, 18115), (248, 18136), (249, 18145), (253, 18178), (265, 18244), (271, 18274), (277, 18316),

Gene: CookieDog\_24 Start: 14559, Stop: 16421, Start Num: 30

Candidate Starts for CookieDog\_24:

(14, 14334), (26, 14529), (Start: 30 @14559 has 33 MA's), (39, 14619), (42, 14640), (46, 14652), (52, 14706), (56, 14739), (83, 14973), (100, 15117), (104, 15171), (105, 15174), (109, 15204), (115, 15276), (128, 15399), (134, 15471), (137, 15504), (140, 15528), (149, 15576), (189, 15867), (241, 16143), (243, 16170), (251, 16233), (265, 16320), (278, 16413),

Gene: Dismas\_17 Start: 13661, Stop: 15667, Start Num: 30

Candidate Starts for Dismas\_17:

(Start: 30 @13661 has 33 MA's), (49, 13778), (57, 13847), (61, 13865), (64, 13877), (67, 13907), (72, 13958), (73, 13961), (74, 13970), (77, 14003), (84, 14081), (91, 14123), (98, 14180), (99, 14204), (106, 14267), (112, 14321), (116, 14393), (120, 14432), (121, 14435), (137, 14594), (140, 14618), (147, 14660), (148, 14663), (153, 14693), (163, 14747), (165, 14759), (167, 14795), (168, 14804), (171, 14837), (173, 14849), (190, 14978), (207, 15065), (216, 15122), (217, 15125), (218, 15137), (226, 15185), (233, 15221), (265, 15437), (268, 15455), (270, 15461), (280, 15611), (281, 15620),

Gene: Doobus\_18 Start: 14247, Stop: 16097, Start Num: 30

Candidate Starts for Doobus\_18:

(Start: 30 @14247 has 33 MA's), (58, 14436), (66, 14478), (67, 14493), (68, 14505), (80, 14628), (84, 14667), (97, 14760), (120, 15018), (147, 15246), (153, 15279), (154, 15288), (170, 15411), (208, 15636), (210, 15657), (219, 15702), (236, 15804), (239, 15819), (248, 15888), (257, 15936), (260, 15963), (262, 15972), (269, 16023),

Gene: Dropshot\_23 Start: 14425, Stop: 16293, Start Num: 30

Candidate Starts for Dropshot\_23:

(14, 14200), (26, 14395), (Start: 30 @14425 has 33 MA's), (39, 14485), (42, 14506), (46, 14518), (52, 14572), (56, 14605), (75, 14734), (82, 14827), (104, 15037), (105, 15040), (109, 15070), (115, 15142), (128, 15265), (137, 15370), (140, 15394), (149, 15442), (189, 15739), (201, 15790), (204, 15808), (209, 15835), (212, 15853), (214, 15868), (241, 16015), (243, 16042), (251, 16105), (265, 16192), (278, 16285),

Gene: FireCastle\_21 Start: 16238, Stop: 18142, Start Num: 30

Candidate Starts for FireCastle\_21:

(Start: 30 @16238 has 33 MA's), (38, 16289), (41, 16313), (50, 16361), (52, 16385), (53, 16388), (63, 16448), (68, 16484), (74, 16535), (81, 16628), (88, 16694), (102, 16841), (104, 16871), (105, 16874), (112, 16934), (121, 17048), (130, 17111), (135, 17183), (137, 17204), (140, 17228), (148, 17273), (151, 17294), (156, 17321), (164, 17366), (169, 17426), (184, 17540), (220, 17756), (221, 17765), (228, 17813), (243, 17900), (248, 17933), (263, 18023),

Gene: Gingerbug\_20 Start: 14337, Stop: 16679, Start Num: 4

Candidate Starts for Gingerbug\_20:

(Start: 4 @14337 has 1 MA's), (6, 14445), (7, 14460), (8, 14484), (9, 14487), (10, 14523), (12, 14574), (13, 14595), (16, 14652), (17, 14664), (18, 14679), (19, 14715), (35, 14871), (37, 14883), (42, 14934), (55, 15018), (58, 15051), (59, 15054), (63, 15078), (90, 15345), (101, 15453), (104, 15486), (105, 15489), (106, 15495), (107, 15504), (109, 15519), (113, 15561), (114, 15579), (117, 15627), (137, 15819), (140, 15843), (142, 15849), (144, 15855), (145, 15876), (146, 15879), (150, 15900), (158, 15954), (159, 15957), (164, 15981), (167, 16020), (169, 16041), (172, 16074), (198, 16188), (245, 16452), (247, 16464), (251, 16503), (264, 16563), (267, 16587),

Gene: Goodman\_22 Start: 16381, Stop: 18258, Start Num: 30

Candidate Starts for Goodman\_22:

(Start: 30 @16381 has 33 MA's), (48, 16510), (52, 16549), (53, 16552), (65, 16621), (71, 16666), (74, 16702), (85, 16831), (104, 17011), (105, 17014), (110, 17047), (117, 17152), (119, 17173), (122, 17191), (123, 17194), (140, 17368), (148, 17413), (152, 17440), (155, 17455), (158, 17479), (160, 17485), (164, 17506), (168, 17554), (192, 17722), (193, 17725), (198, 17746), (200, 17758), (213, 17833), (245, 18028), (248, 18049), (249, 18058), (253, 18091), (265, 18157), (271, 18187), (277, 18229),

Gene: Guzman\_25 Start: 14840, Stop: 16702, Start Num: 30

Candidate Starts for Guzman\_25:

(14, 14615), (26, 14810), (Start: 30 @14840 has 33 MA's), (39, 14900), (42, 14921), (46, 14933), (52, 14987), (56, 15020), (75, 15149), (102, 15422), (104, 15452), (105, 15455), (107, 15470), (109, 15485), (115, 15557), (128, 15680), (134, 15752), (137, 15785), (140, 15809), (146, 15845), (149, 15857), (158, 15920), (189, 16148), (241, 16424), (243, 16451), (251, 16514), (265, 16601), (278, 16694),

Gene: Htur\_21 Start: 16411, Stop: 18312, Start Num: 30

Candidate Starts for Htur\_21:

(Start: 30 @16411 has 33 MA's), (33, 16432), (34, 16438), (48, 16540), (52, 16579), (53, 16582), (65, 16651), (74, 16732), (76, 16762), (85, 16861), (89, 16903), (103, 17044), (104, 17065), (105, 17068), (110, 17101), (117, 17206), (122, 17245), (123, 17248), (131, 17308), (139, 17416), (140, 17422), (152, 17494), (155, 17509), (158, 17533), (160, 17539), (164, 17560), (168, 17608), (173, 17659), (176, 17680), (192, 17776), (198, 17800), (200, 17812), (211, 17875), (222, 17932), (230, 17986), (241, 18043), (243, 18070), (244, 18076), (245, 18082), (247, 18094), (253, 18145), (277, 18283),

Gene: IndiRoo\_22 Start: 14680, Stop: 16581, Start Num: 30

Candidate Starts for IndiRoo\_22:

(Start: 30 @14680 has 33 MA's), (38, 14731), (52, 14827), (53, 14830), (56, 14860), (63, 14890), (74, 14977), (75, 14989), (76, 15007), (85, 15109), (87, 15121), (89, 15148), (102, 15283), (104, 15313), (105, 15316), (109, 15346), (115, 15418), (128, 15541), (137, 15646), (140, 15670), (148, 15715), (149, 15718), (151, 15736), (153, 15745), (154, 15754), (155, 15757), (157, 15766), (164, 15808), (169, 15868), (175, 15916), (184, 15982), (194, 16048), (198, 16072), (220, 16195), (221, 16204), (228, 16252), (234, 16285), (243, 16339), (248, 16372), (263, 16462), (274, 16525),

Gene: Jakelyne\_26 Start: 14641, Stop: 16509, Start Num: 30

Candidate Starts for Jakelyne\_26:

(14, 14416), (26, 14611), (Start: 30 @14641 has 33 MA's), (39, 14701), (42, 14722), (46, 14734), (52, 14788), (56, 14821), (75, 14950), (82, 15043), (100, 15199), (104, 15253), (105, 15256), (109, 15286), (115, 15358), (128, 15481), (137, 15586), (140, 15610), (149, 15658), (189, 15955), (201, 16006), (204, 16024), (209, 16051), (212, 16069), (214, 16084), (241, 16231), (243, 16258), (251, 16321), (265, 16408), (278, 16501),

Gene: Jera\_22 Start: 15478, Stop: 17370, Start Num: 30

Candidate Starts for Jera\_22:

(Start: 30 @15478 has 33 MA's), (48, 15607), (52, 15646), (65, 15718), (74, 15799), (75, 15811), (85, 15928), (93, 15994), (103, 16087), (104, 16108), (105, 16111), (110, 16144), (117, 16249), (123, 16291), (124, 16309), (139, 16459), (140, 16465), (152, 16537), (155, 16552), (158, 16576), (160, 16582), (164, 16603), (168, 16651), (189, 16816), (191, 16822), (199, 16852), (203, 16876), (204, 16885), (205, 16891), (209, 16912), (214, 16945), (238, 17080), (242, 17110), (243, 17119), (244, 17125), (275, 17314), (276, 17335),

Gene: Johann\_22 Start: 16381, Stop: 18258, Start Num: 30

Candidate Starts for Johann\_22:

(Start: 30 @16381 has 33 MA's), (48, 16510), (52, 16549), (53, 16552), (65, 16621), (71, 16666), (74, 16702), (85, 16831), (104, 17011), (105, 17014), (110, 17047), (117, 17152), (119, 17173), (122, 17191), (123, 17194), (140, 17368), (148, 17413), (152, 17440), (155, 17455), (158, 17479), (160, 17485), (164, 17506), (168, 17554), (192, 17722), (193, 17725), (198, 17746), (200, 17758), (213, 17833), (245, 18028), (248, 18049), (249, 18058), (253, 18091), (265, 18157), (271, 18187), (277, 18229),

Gene: Kenzers\_18 Start: 13986, Stop: 15836, Start Num: 30

Candidate Starts for Kenzers\_18:

(Start: 30 @13986 has 33 MA's), (58, 14175), (66, 14217), (67, 14232), (68, 14244), (84, 14406), (120, 14757), (147, 14985), (153, 15018), (165, 15084), (208, 15375), (210, 15396), (219, 15441), (232, 15519), (239, 15558), (248, 15627), (257, 15675), (260, 15702), (262, 15711), (269, 15762),

Gene: Kieran\_17 Start: 13664, Stop: 15670, Start Num: 30

Candidate Starts for Kieran\_17:

(Start: 30 @13664 has 33 MA's), (49, 13781), (57, 13850), (61, 13868), (64, 13880), (67, 13910), (72, 13961), (73, 13964), (74, 13973), (77, 14006), (84, 14084), (91, 14126), (98, 14183), (99, 14207), (106, 14270), (112, 14324), (116, 14396), (120, 14435), (121, 14438), (137, 14597), (140, 14621), (147,



14663), (148, 14666), (153, 14696), (163, 14750), (165, 14762), (167, 14798), (168, 14807), (171, 14840), (173, 14852), (190, 14981), (207, 15068), (216, 15125), (217, 15128), (218, 15140), (226, 15188), (233, 15224), (265, 15440), (268, 15458), (270, 15464), (280, 15614), (281, 15623),

Gene: Kors\_33 Start: 18533, Stop: 20482, Start Num: 27

Candidate Starts for Kors\_33:

(24, 18518), (25, 18521), (Start: 27 @18533 has 2 MA's), (28, 18545), (Start: 29 @18548 has 2 MA's), (36, 18608), (45, 18659), (56, 18749), (62, 18779), (69, 18836), (70, 18839), (78, 18929), (86, 19016), (97, 19097), (104, 19181), (113, 19256), (116, 19316), (126, 19397), (132, 19448), (140, 19541), (141, 19544), (143, 19550), (155, 19628), (161, 19664), (165, 19682), (178, 19838), (185, 19922), (193, 19946), (232, 20162), (240, 20204), (257, 20321), (259, 20342),

Gene: Linayshia\_21 Start: 16403, Stop: 18304, Start Num: 30

Candidate Starts for Linayshia\_21:

(Start: 30 @16403 has 33 MA's), (33, 16424), (34, 16430), (48, 16532), (52, 16571), (53, 16574), (65, 16643), (74, 16724), (76, 16754), (85, 16853), (89, 16895), (103, 17036), (104, 17057), (105, 17060), (110, 17093), (117, 17198), (122, 17237), (123, 17240), (131, 17300), (139, 17408), (140, 17414), (152, 17486), (155, 17501), (158, 17525), (160, 17531), (164, 17552), (168, 17600), (173, 17651), (176, 17672), (192, 17768), (198, 17792), (200, 17804), (211, 17867), (222, 17924), (230, 17978), (241, 18035), (243, 18062), (244, 18068), (245, 18074), (247, 18086), (253, 18137), (277, 18275),

Gene: LordBart\_32 Start: 18449, Stop: 20398, Start Num: 27

Candidate Starts for LordBart\_32:

(24, 18434), (25, 18437), (Start: 27 @18449 has 2 MA's), (28, 18461), (Start: 29 @18464 has 2 MA's), (36, 18524), (45, 18575), (56, 18665), (62, 18695), (69, 18752), (70, 18755), (78, 18845), (86, 18932), (97, 19013), (104, 19097), (113, 19172), (116, 19232), (126, 19313), (132, 19364), (140, 19457), (141, 19460), (143, 19466), (155, 19544), (161, 19580), (165, 19598), (178, 19754), (185, 19838), (193, 19862), (232, 20078), (240, 20120), (257, 20237), (259, 20258),

Gene: Losacky\_26 Start: 14705, Stop: 16573, Start Num: 30

Candidate Starts for Losacky\_26:

(14, 14480), (26, 14675), (Start: 30 @14705 has 33 MA's), (39, 14765), (42, 14786), (46, 14798), (52, 14852), (56, 14885), (58, 14891), (82, 15107), (100, 15263), (104, 15317), (105, 15320), (109, 15350), (115, 15422), (128, 15545), (134, 15617), (137, 15650), (140, 15674), (149, 15722), (158, 15785), (189, 16019), (201, 16070), (204, 16088), (209, 16115), (212, 16133), (214, 16148), (241, 16295), (243, 16322), (251, 16385), (265, 16472), (278, 16565),

Gene: Lynlen\_18 Start: 13986, Stop: 15836, Start Num: 30

Candidate Starts for Lynlen\_18:

(Start: 30 @13986 has 33 MA's), (58, 14175), (66, 14217), (67, 14232), (68, 14244), (84, 14406), (120, 14757), (147, 14985), (153, 15018), (165, 15084), (208, 15375), (210, 15396), (219, 15441), (232, 15519), (239, 15558), (248, 15627), (257, 15675), (260, 15702), (262, 15711), (269, 15762),

Gene: MenE\_24 Start: 14693, Stop: 16561, Start Num: 30

Candidate Starts for MenE\_24:

(14, 14468), (26, 14663), (Start: 30 @14693 has 33 MA's), (39, 14753), (42, 14774), (46, 14786), (52, 14840), (56, 14873), (58, 14879), (82, 15095), (100, 15251), (104, 15305), (105, 15308), (109, 15338), (115, 15410), (128, 15533), (134, 15605), (137, 15638), (140, 15662), (149, 15710), (158, 15773), (189, 16007), (201, 16058), (204, 16076), (209, 16103), (212, 16121), (214, 16136), (241, 16283), (243, 16310), (251, 16373), (265, 16460), (278, 16553),

Gene: Milani\_22 Start: 15329, Stop: 17206, Start Num: 30

Candidate Starts for Milani\_22:

(Start: 30 @15329 has 33 MA's), (38, 15380), (52, 15476), (53, 15479), (63, 15539), (76, 15656), (85, 15758), (87, 15770), (93, 15845), (102, 15932), (104, 15962), (105, 15965), (109, 15995), (112, 16025), (113, 16037), (115, 16067), (129, 16199), (137, 16295), (140, 16319), (148, 16364), (149, 16367), (153, 16394), (155, 16406), (157, 16415), (164, 16457), (169, 16517), (195, 16685), (215, 16802), (226, 16859), (228, 16877), (231, 16889), (232, 16892), (236, 16916), (243, 16964), (248, 16997), (258, 17051),

Gene: Olympi\_22 Start: 16368, Stop: 18245, Start Num: 30

Candidate Starts for Olympi\_22:

(Start: 30 @16368 has 33 MA's), (48, 16497), (52, 16536), (53, 16539), (65, 16608), (71, 16653), (74, 16689), (85, 16818), (104, 16998), (105, 17001), (110, 17034), (111, 17058), (117, 17139), (122, 17178), (123, 17181), (133, 17271), (140, 17355), (152, 17427), (155, 17442), (158, 17466), (160, 17472), (164, 17493), (168, 17541), (192, 17709), (193, 17712), (198, 17733), (200, 17745), (213, 17820), (245, 18015), (248, 18036), (249, 18045), (253, 18078), (265, 18144), (271, 18174), (277, 18216),

Gene: PermaG\_22 Start: 16442, Stop: 18325, Start Num: 30

Candidate Starts for PermaG\_22:

(26, 16412), (Start: 30 @16442 has 33 MA's), (48, 16571), (52, 16610), (53, 16613), (65, 16682), (74, 16763), (85, 16892), (96, 16970), (104, 17072), (105, 17075), (117, 17213), (122, 17252), (123, 17255), (136, 17399), (140, 17429), (155, 17516), (158, 17540), (160, 17546), (164, 17567), (168, 17615), (192, 17783), (193, 17786), (198, 17807), (200, 17819), (227, 17975), (241, 18050), (242, 18068), (251, 18137), (265, 18224), (266, 18227), (272, 18260),

Gene: PhillyJawn\_24 Start: 14425, Stop: 16293, Start Num: 30

Candidate Starts for PhillyJawn\_24:

(14, 14200), (26, 14395), (Start: 30 @14425 has 33 MA's), (39, 14485), (42, 14506), (46, 14518), (52, 14572), (56, 14605), (75, 14734), (82, 14827), (100, 14983), (104, 15037), (105, 15040), (109, 15070), (115, 15142), (128, 15265), (137, 15370), (140, 15394), (149, 15442), (189, 15739), (201, 15790), (204, 15808), (212, 15853), (214, 15868), (241, 16015), (243, 16042), (251, 16105), (265, 16192), (278, 16285),

Gene: Phingu\_26 Start: 14644, Stop: 16512, Start Num: 30

Candidate Starts for Phingu\_26:

(14, 14419), (26, 14614), (Start: 30 @14644 has 33 MA's), (39, 14704), (42, 14725), (46, 14737), (52, 14791), (56, 14824), (75, 14953), (82, 15046), (100, 15202), (104, 15256), (105, 15259), (109, 15289), (115, 15361), (128, 15484), (134, 15556), (137, 15589), (140, 15613), (149, 15661), (158, 15724), (189, 15958), (201, 16009), (204, 16027), (212, 16072), (214, 16087), (241, 16234), (243, 16261), (251, 16324), (265, 16411), (278, 16504),

Gene: Phonegingi\_23 Start: 14486, Stop: 16339, Start Num: 30

Candidate Starts for Phonegingi\_23:

(14, 14261), (26, 14456), (Start: 30 @14486 has 33 MA's), (39, 14546), (42, 14567), (46, 14579), (52, 14633), (56, 14666), (75, 14795), (94, 14984), (100, 15044), (104, 15098), (105, 15101), (109, 15131), (115, 15203), (128, 15326), (132, 15365), (134, 15398), (137, 15431), (140, 15455), (149, 15503), (153, 15530), (157, 15551), (164, 15593), (166, 15620), (201, 15851), (204, 15869), (229, 16016), (243, 16103), (245, 16115), (251, 16160), (253, 16172), (259, 16193), (271, 16268), (277, 16310), (278, 16331),

Gene: Pickles13\_23 Start: 14850, Stop: 16718, Start Num: 30

Candidate Starts for Pickles13\_23:

(14, 14625), (26, 14820), (Start: 30 @14850 has 33 MA's), (39, 14910), (42, 14931), (46, 14943), (52, 14997), (56, 15030), (57, 15033), (102, 15432), (104, 15462), (105, 15465), (109, 15495), (115,

15567), (128, 15690), (134, 15762), (137, 15795), (140, 15819), (146, 15855), (149, 15867), (153, 15894), (158, 15930), (170, 16026), (189, 16164), (204, 16233), (209, 16260), (241, 16440), (243, 16467), (251, 16530), (265, 16617), (278, 16710),

Gene: Rasovi\_21 Start: 16411, Stop: 18312, Start Num: 30

Candidate Starts for Rasovi\_21:

(Start: 30 @16411 has 33 MA's), (33, 16432), (34, 16438), (48, 16540), (53, 16582), (65, 16651), (74, 16732), (76, 16762), (85, 16861), (89, 16903), (103, 17044), (104, 17065), (105, 17068), (110, 17101), (117, 17206), (122, 17245), (123, 17248), (131, 17308), (139, 17416), (140, 17422), (152, 17494), (155, 17509), (158, 17533), (160, 17539), (164, 17560), (168, 17608), (173, 17659), (176, 17680), (192, 17776), (198, 17800), (200, 17812), (211, 17875), (222, 17932), (230, 17986), (241, 18043), (243, 18070), (244, 18076), (245, 18082), (247, 18094), (253, 18145), (277, 18283),

Gene: RikSengupta\_32 Start: 18570, Stop: 20519, Start Num: 27

Candidate Starts for RikSengupta\_32:

(24, 18555), (25, 18558), (Start: 27 @18570 has 2 MA's), (28, 18582), (Start: 29 @18585 has 2 MA's), (36, 18645), (45, 18696), (56, 18786), (62, 18816), (69, 18873), (70, 18876), (72, 18906), (78, 18966), (86, 19053), (97, 19134), (104, 19218), (113, 19293), (116, 19353), (126, 19434), (132, 19485), (140, 19578), (141, 19581), (143, 19587), (155, 19665), (161, 19701), (165, 19719), (178, 19875), (185, 19959), (193, 19983), (232, 20199), (240, 20241), (257, 20358), (259, 20379),

Gene: Rona\_17 Start: 13661, Stop: 15667, Start Num: 30

Candidate Starts for Rona\_17:

(Start: 30 @13661 has 33 MA's), (49, 13778), (57, 13847), (61, 13865), (64, 13877), (67, 13907), (72, 13958), (73, 13961), (74, 13970), (77, 14003), (84, 14081), (91, 14123), (98, 14180), (99, 14204), (106, 14267), (112, 14321), (116, 14393), (120, 14432), (121, 14435), (137, 14594), (140, 14618), (147, 14660), (148, 14663), (153, 14693), (163, 14747), (165, 14759), (167, 14795), (168, 14804), (171, 14837), (173, 14849), (190, 14978), (207, 15065), (216, 15122), (217, 15125), (218, 15137), (226, 15185), (233, 15221), (265, 15437), (268, 15455), (270, 15461), (280, 15611), (281, 15620),

Gene: SBlackberry\_21 Start: 16237, Stop: 18123, Start Num: 30

Candidate Starts for SBlackberry\_21:

(Start: 30 @16237 has 33 MA's), (48, 16366), (52, 16405), (65, 16477), (74, 16558), (75, 16570), (85, 16687), (90, 16729), (103, 16846), (104, 16867), (105, 16870), (110, 16903), (117, 17008), (122, 17047), (123, 17050), (125, 17080), (139, 17218), (140, 17224), (152, 17296), (155, 17311), (158, 17335), (160, 17341), (164, 17362), (168, 17410), (174, 17467), (186, 17566), (189, 17575), (191, 17581), (203, 17635), (209, 17671), (245, 17893), (248, 17914), (249, 17923), (253, 17956), (265, 18022), (271, 18052), (277, 18094),

Gene: Sharkboy\_17 Start: 13660, Stop: 15654, Start Num: 30

Candidate Starts for Sharkboy\_17:

(Start: 30 @13660 has 33 MA's), (44, 13753), (61, 13864), (67, 13906), (74, 13969), (84, 14080), (95, 14149), (106, 14266), (112, 14320), (140, 14617), (147, 14659), (153, 14692), (162, 14740), (167, 14794), (187, 14971), (190, 14977), (197, 15001), (216, 15106), (231, 15199), (246, 15292), (252, 15355), (268, 15457), (273, 15478), (279, 15544),

Gene: Sparcetus\_32 Start: 18449, Stop: 20398, Start Num: 27

Candidate Starts for Sparcetus\_32:

(24, 18434), (25, 18437), (Start: 27 @18449 has 2 MA's), (28, 18461), (Start: 29 @18464 has 2 MA's), (36, 18524), (45, 18575), (56, 18665), (62, 18695), (69, 18752), (70, 18755), (78, 18845), (86, 18932), (97, 19013), (104, 19097), (113, 19172), (116, 19232), (126, 19313), (132, 19364), (140, 19457), (141, 19460), (143, 19466), (155, 19544), (161, 19580), (165, 19598), (178, 19754), (185, 19838), (193, 19862), (232, 20078), (240, 20120), (257, 20237), (259, 20258),

Gene: Sucha\_18 Start: 13667, Stop: 15568, Start Num: 30

Candidate Starts for Sucha\_18:

(Start: 30 @13667 has 33 MA's), (38, 13718), (52, 13814), (53, 13817), (56, 13847), (60, 13856), (74, 13964), (75, 13976), (76, 13994), (85, 14096), (87, 14108), (89, 14135), (94, 14186), (102, 14270), (104, 14300), (105, 14303), (109, 14333), (132, 14567), (137, 14633), (140, 14657), (148, 14702), (149, 14705), (154, 14741), (155, 14744), (164, 14795), (169, 14855), (175, 14903), (220, 15182), (221, 15191), (228, 15239), (234, 15272), (239, 15293), (243, 15326), (263, 15449),

Gene: TinyMiny\_32 Start: 18483, Stop: 20417, Start Num: 29

Candidate Starts for TinyMiny\_32:

(24, 18453), (25, 18456), (Start: 27 @18468 has 2 MA's), (28, 18480), (Start: 29 @18483 has 2 MA's), (36, 18543), (45, 18594), (56, 18684), (62, 18714), (69, 18771), (70, 18774), (78, 18864), (86, 18951), (97, 19032), (104, 19116), (113, 19191), (116, 19251), (126, 19332), (132, 19383), (140, 19476), (141, 19479), (143, 19485), (155, 19563), (161, 19599), (165, 19617), (178, 19773), (185, 19857), (193, 19881), (232, 20097), (240, 20139), (257, 20256), (259, 20277),

Gene: TurboVicky\_21 Start: 16231, Stop: 18123, Start Num: 30

Candidate Starts for TurboVicky\_21:

(Start: 30 @16231 has 33 MA's), (48, 16360), (52, 16399), (53, 16402), (65, 16471), (74, 16552), (75, 16564), (85, 16681), (103, 16840), (104, 16861), (105, 16864), (110, 16897), (117, 17002), (122, 17041), (123, 17044), (124, 17062), (125, 17074), (139, 17212), (140, 17218), (152, 17290), (155, 17305), (158, 17329), (160, 17335), (164, 17356), (168, 17404), (189, 17569), (191, 17575), (199, 17605), (204, 17638), (205, 17644), (214, 17698), (223, 17737), (238, 17833), (244, 17878), (247, 17896), (265, 18022), (275, 18067), (276, 18088),

Gene: Typher\_23 Start: 16361, Stop: 18253, Start Num: 30

Candidate Starts for Typher\_23:

(Start: 30 @16361 has 33 MA's), (48, 16490), (52, 16529), (53, 16532), (65, 16601), (74, 16682), (75, 16694), (85, 16811), (103, 16970), (104, 16991), (105, 16994), (110, 17027), (117, 17132), (122, 17171), (123, 17174), (124, 17192), (125, 17204), (139, 17342), (140, 17348), (152, 17420), (155, 17435), (158, 17459), (160, 17465), (164, 17486), (168, 17534), (189, 17699), (191, 17705), (199, 17735), (204, 17768), (205, 17774), (214, 17828), (238, 17963), (243, 18002), (247, 18026), (275, 18197), (276, 18218),

Gene: Warren\_24 Start: 14623, Stop: 16491, Start Num: 30

Candidate Starts for Warren\_24:

(14, 14398), (26, 14593), (Start: 30 @14623 has 33 MA's), (39, 14683), (42, 14704), (46, 14716), (52, 14770), (56, 14803), (82, 15025), (100, 15181), (104, 15235), (105, 15238), (109, 15268), (115, 15340), (128, 15463), (134, 15535), (140, 15592), (149, 15640), (158, 15703), (170, 15799), (189, 15937), (201, 15988), (204, 16006), (209, 16033), (243, 16240), (265, 16390), (275, 16435), (278, 16483),

Gene: Wrackline\_28 Start: 15957, Stop: 17840, Start Num: 30

Candidate Starts for Wrackline\_28:

(Start: 30 @15957 has 33 MA's), (31, 15963), (32, 15972), (38, 16008), (39, 16017), (40, 16026), (43, 16038), (52, 16104), (63, 16167), (67, 16191), (75, 16266), (79, 16320), (85, 16386), (98, 16509), (104, 16587), (105, 16590), (109, 16620), (113, 16662), (115, 16692), (117, 16728), (121, 16764), (132, 16854), (136, 16914), (140, 16944), (142, 16950), (144, 16956), (146, 16980), (148, 16989), (149, 16992), (153, 17019), (154, 17028), (158, 17055), (164, 17082), (167, 17121), (169, 17142), (177, 17202), (179, 17205), (181, 17214), (182, 17226), (185, 17280), (188, 17295), (228, 17508), (231, 17520), (235, 17544), (240, 17565), (255, 17676), (256, 17679), (260, 17706), (262, 17715), (269, 17766),

Gene: Zanella\_21 Start: 16234, Stop: 18126, Start Num: 30

Candidate Starts for Zanella\_21:

(Start: 30 @16234 has 33 MA's), (48, 16363), (52, 16402), (53, 16405), (65, 16474), (74, 16555), (75, 16567), (85, 16684), (103, 16843), (104, 16864), (105, 16867), (110, 16900), (117, 17005), (122, 17044), (123, 17047), (124, 17065), (125, 17077), (139, 17215), (140, 17221), (152, 17293), (155, 17308), (158, 17332), (160, 17338), (164, 17359), (168, 17407), (189, 17572), (191, 17578), (199, 17608), (204, 17641), (205, 17647), (214, 17701), (223, 17740), (238, 17836), (244, 17881), (247, 17899), (265, 18025), (275, 18070), (276, 18091),